

Changing or Defending Our Behaviour: The Role of Attitude Importance and Choice in
the Arousal and Reduction of Cognitive Dissonance

by

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A thesis submitted to
the Faculty of Graduate and Postdoctoral Affairs
in partial fulfillment of the requirements for the degree

Doctor of Philosophy

in

Psychology

Carleton University
Ottawa, Canada

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Your file *Votre référence*
ISBN: 978-0-494-83211-0
Our file *Notre référence*
ISBN: 978-0-494-83211-0

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Abstract

The role of attitude importance in the arousal of cognitive dissonance and the process of dissonance reduction was investigated in two experiments. In Experiment 1, a hypocrisy procedure was used to induce dissonance among participants ($N = 150$) with either low or high levels of attitude importance toward an animal welfare issue. Following this, participants chose one dissonance reduction strategy from four possible options. As predicted, participants high in attitude importance experienced more dissonance than those low in attitude importance. Although attitude importance was related to the reduction strategy participants chose, overall participants preferred to reduce their dissonance through justification techniques rather than engage in a behavioural reduction strategy. In Experiment 2, the researcher assigned participants ($N = 98$) to the standard hypocrisy procedure or to an alternative hypocrisy procedure that included the use of potentially upsetting video footage. The four dissonance reduction strategies were altered such that they all required participants to write as a means of reducing dissonance. The attitude importance effect from Experiment 1 was partially replicated; participants in the hypocrisy plus video condition experienced more dissonance if they had high levels of attitude importance, but those in the standard hypocrisy condition were not affected in this way. Furthermore, many participants preferred to write about what they could do to support the animal welfare issue rather than justify their behaviour. The implications these findings have for our understanding of dissonance arousal and reduction are discussed.

Acknowledgements

I am grateful for the guidance, support, and insight that I received from my advisor, Dr. Bernadette Campbell. By supporting me in a topic I found truly interesting she made this entire process surprisingly simple at times. Thank you for all of the time, energy, and thoughtfulness you put into this project and for agreeing to a student's request to base a dissertation around the topic of free-range chicken eggs.

The excellent feedback I received from Dr. Connie Kristiansen and Dr. Tim Pychyl was key to the success of this project. Thank you for being involved in my dissertation from the beginning, providing feedback, and alerting me to potential pitfalls. Thank you to Dr. Mira Sucharov and Dr. Lee Fabrigar for their time, questions, and feedback. My thinking about dissonance has been influenced by their helpful comments.

Thank you to the members of the Applied Social Psychology Lab. Many thoughtful comments arose from our discussions. A special thank you to Rebecca Mugford and Karla Emeno for allowing me to discuss statistics during what should have been relaxing nights out. The discussions we had were very helpful; thank you for always listening and providing good advice. And many thanks to Kelley Robinson and Alyssa Taylor for all of the conversations we shared about data collection, writing, analysis, and ultimately about how to survive one's doctoral degree. Whenever I needed your support you knew exactly what to say, and you made this whole process easier.

Lastly, thank you to my husband, Tiago Lier, for always believing in my abilities even when I did not. You help me to think about events from a beyond a psychological interpretation and as such you make me a better scholar. Thank you for your love and support.

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Introduction

People seldom do what they believe in. They do what is convenient, then repent.

— Bob Dylan

Were the walls of our meat industry to become transparent, literally or even figuratively... tail-docking and sow crates and beak-clipping would disappear overnight.

— Michael Pollan

Individuals' attitudes and actions toward nonhuman animals have changed over the past several decades in significant ways, and yet in other ways our actions toward animals have changed very little. Children and adults alike express fascination with nonhuman animals and go to great lengths to care for domestic pets that may be considered members of one's household. However, at the same time people behave in cruel ways toward other nonhuman animals perhaps not directly, but certainly indirectly through the consumption of various animal products, including meat produced by unethical methods (Singer & Mason, 2007). How is it that we can both love animals and treat them so poorly, especially when confronted with the realities of modern livestock practices? It may be the case that, while such knowledge produces discomfort, ultimately people decide that changing their eating habits is too difficult and instead they look for alternative ways by which to reduce this discomfort. They may, for example, insist that organically and ethically produced food is too expensive, place the blame for unethical food production on farmers, or simply minimize the importance of animal suffering. Given these possibilities, the current research examined when and for whom cognitive dissonance is related to food consumption and the specific paths that individuals chose as a means of reducing their feelings of dissonance.

Avoiding Unethically Produced Food

Modern livestock practices may not produce discomfort in some individuals, but for others such practices have inspired significant changes in their food consumption behaviour. Vegetarianism is a dietary practice that has grown in popularity over the past century. Approximately four percent of Canadians now follow a vegetarian diet (American Dietetic Association & Dietitians of Canada, 2003). While vegetarians exclude meat from their diet, those who ascribe to a vegan lifestyle do not purchase or consume any animal products (such as eggs, wool, and cheese). The most frequently reported motivation for following these diets is concern for animal welfare (Janda & Trocchia, 2001). Many vegetarians feel empathy for animals raised as livestock, and they may also feel guilt over the slaughter of animals.

One process that may play an important role in the adoption of vegetarian and vegan lifestyles is cognitive dissonance. Individuals who value the lives and well-being of animals but who also benefit from animal use practices are confronted with a dilemma that results from inconsistent cognitions (Knight, 2008). For example, an individual who believes that animals deserve humane treatment may experience discomfort in acknowledging how a cow is raised and slaughtered to produce a steak for her consumption. To overcome this dilemma people may justify their behaviour or actively avoid learning about the negative consequences of animal use practices because they believe such information will be distressing (Knight, 2008). Using these strategies may prevent or resolve any discomfort resulting from the dilemma and thereby allow the person to still enjoy the benefits of animal use practices without experiencing discomfort

or guilt. Yet we know that not everyone chooses these strategies as a way to reduce their discomfort; others change their behaviour.

Findings from one study suggest that some individuals adopt different lifestyle practices to resolve feelings of dissonance aroused by the use of animal products (Racek, 2009). After reviewing narrative accounts about dietary experiences from a sample of 29 vegan participants, it would seem that cognitive dissonance does act as a motivating force that helps change one's eating behaviour. In this study, vegans reported learning about how farm animals are treated through books, films, and communication with close others. After learning about these practices nearly one quarter of participants referred to their behaviour as hypocritical and recognized this experience as key to their adoption of a vegan diet:

I realized the hypocrisy of my earlier choices -- I never would have bought clothing with fur in a million years, and yet I owned leather shoes and sweaters with wool. I felt bad that I never realized these things before. (Racek, 2009)

The experience of cognitive dissonance can be resolved through different means. The current experiments sought to illuminate our understanding of the dissonance reduction strategies that people choose. When confronted with a discomforting dilemma is there one strategy that people prefer to use most often, and if so, what determines their preferences? Does the personal importance of the issue affect the magnitude of dissonance experienced by the individual? Does the amount of dissonance reduced vary as a function of the chosen reduction strategy? And importantly, when are people more likely to change their behaviour rather than resolve dissonance in other ways? The

purpose of these studies was to refine our understanding of dissonance arousal and reduction by addressing these questions.

History of Cognitive Dissonance Theory

The theory of cognitive dissonance first arose out of a research project intended to understand the communication of rumors. While reviewing literature concerning the spreading of rumors, Leon Festinger and his colleagues came across a study with some puzzling results. Prasad (1950) recorded rumors following an earthquake in India. The earthquake was strong and felt over a large area, but the resulting damage occurred in only a small area (Festinger, 1957, p. 237). Prasad documented rumors among people living outside of the damage-affected area. These individuals experienced the earthquake but did not observe any damage from its effects. Surprisingly, instead of being relieved that the earthquake had ended and that no damage occurred in their area, these individuals circulated rumors about forthcoming doom. Festinger argued that these rumors served a fear-justifying purpose essential to reducing dissonance experienced by these people. Following the earthquake, residents outside of the damaged areas were likely afraid, but without an observable reason for feeling this way. That is, the cognition of “I’m afraid” was inconsistent with the cognition “we suffered no damage and have nothing to be afraid about.” According to dissonance theory, the propagation of fear-arousing rumors (*i.e.*, predictions of future disaster) served to justify how the residents felt and ultimately reduce their experience of dissonance. However, to conclude that dissonance theory accurately explained these rumors it would be necessary to document rumors from people within damaged areas. These people observed fatal casualties and damage, and therefore had a reason to feel afraid. Given this, rumors about forthcoming

doom should not circulate in such areas according to dissonance theory. Although Prasad (1950) did not collect such data, they were collected in a study of rumors following a landslide in Darjeeling, India (Sinha, 1952). Consistent with dissonance theory, eyewitnesses of the landslide's devastating effects did not circulate rumors about impending doom, presumably because their fear did not need to be justified.

Before formalizing his theory in *A Theory of Cognitive Dissonance* (Festinger, 1957), Festinger provided a case study that documented the process of dissonance arousal and reduction in *When Prophecy Fails* (Festinger, Riecken, & Schachter, 1956). Festinger had learned about a cult's (referred to as The Seekers) belief that the world would end on December 21st, 1955 and saw this as an opportunity to investigate the phenomenon of cognitive dissonance. Through participant observation, researchers working with Festinger infiltrated the doomsday cult and gathered data about cult members' beliefs and actions. As predicted by Festinger, when faced with the inconsistency between their beliefs (e.g., the world will end) and their knowledge that the world did not end, the leader of the group, Marion Keech, created a new cognition to reduce feelings of dissonance. She told her followers that their actions and faith had saved the world from disaster. Equipped with this new belief, Keech and her followers sought publicity to spread their story in the hopes of receiving social support for their beliefs and actions. What could have been an unpleasant experience of dissonance was transformed into a situation that further strengthened The Seekers' resolve.

Understanding Cognitive Dissonance

Festinger (1957) conceived of dissonance as a motivating factor akin to hunger or frustration. He argued that being aware that two cognitions are inconsistent, or dissonant,

with one another produces a feeling of dissonance within an individual, which is experienced as an elevated arousal state accompanied by psychological discomfort. Cognitive elements are considered dissonant when one cognition does not follow from another relevant cognition. Festinger (1957) defined cognitions broadly as “any knowledge, opinion, or belief about the environment, about oneself, or about one’s behaviour” (p. 3). Hence, individuals can experience dissonance on a daily basis simply because, at any time, people have beliefs about a variety of issues, behaviours, and situations. Dissonance may also be aroused when an individual is presented with new information. For example, an individual who purchases conventionally grown produce for his children may experience dissonance when presented with information about the potentially harmful effects of chemical pesticides. Such dissonance results from simultaneously holding the beliefs “I am someone who wants my children to be safe” and “This food may be unsafe.”

Although relatively fleeting instances of dissonance may be experienced on a daily basis as people encounter different situations, information, and choices, Festinger (1957) outlined factors that will likely produce more persistent forms of dissonance. In particular, the magnitude of dissonance varies as a function of the importance of the relevant cognitive elements and the proportion of cognitive elements that are dissonant with the cognition under examination. For example, an ethical vegetarian who goes out for breakfast and eats conventionally raised eggs produced by battery-caged chickens will likely experience a high magnitude of dissonance. This is because animal rights constitute a highly important cognitive element for an ethical vegetarian, which increases the magnitude of her dissonance when confronted with decisions that involve weighing

her desires with the treatment of animals. However, it is not only the importance of cognitive elements that determine the magnitude of dissonance, but also the proportion of cognitions that are dissonant or consonant with the dissonance-producing cognition. An individual may care greatly about animal rights but still consume meat because she believes that farm animals are treated well; she wants to support farmers; and she believes that a healthy diet requires some animal protein. Given these cognitions, the magnitude of dissonance she experiences over eating meat is lessened. Hence the importance and the proportion of dissonant cognitions work together to determine whether an individual will experience a momentary or more enduring feeling of dissonance. Importantly, the magnitude of the dissonance experienced should also determine the intensity with which an individual acts to reduce her feeling of dissonance (Festinger, 1957). However, there are few empirical assessments of whether a higher magnitude of dissonance produces more intense attempts at dissonance reduction (Starzyk, Fabrigar, Soryal, & Fanning, 2009), and the concept of intensity, as it relates to dissonance reduction, has yet to be clearly defined.

Reducing Cognitive Dissonance

Similar to the experience of hunger, an individual experiencing dissonance acts in ways to reduce, and ideally eliminate, the unpleasant feeling of arousal. Festinger (1957) outlined three basic ways that individuals act to reduce feelings of dissonance: by changing a behavioural cognitive element, by changing an environmental cognitive element, and by adding new cognitive elements. One of the most direct ways of reducing dissonance involves changing one's behaviour so that the knowledge of that behaviour no longer conflicts with other cognitive elements. For example, if Susan cares about animals

and experiences dissonance because she eats meat and yet believes that animals suffer when raised and killed for food, she may reduce her dissonance by no longer consuming meat. However, many factors can work against changing one's behaviour in an effort to reduce dissonance. Changing one's behaviour can be difficult; it may involve loss or pain; it may create new dissonance; the present behaviour may be satisfying; or changing the behaviour may not be possible (Festinger, 1957). Given these difficulties, individuals may opt to reduce dissonance by changing an environmental cognitive element, namely one's social reality. To carry on with the above example, Susan could continue to eat meat and reduce her feeling of dissonance by changing her attitude toward farm animals. She could, for example, evaluate farm animals more negatively and only care greatly for pet animals. Changing her cognition in this way may help alleviate her dissonance, especially if she can find people to support her new position. Alternatively, Susan could continue to eat meat and continue to care about farm animals if she added new cognitions that support her behaviour and lessen the magnitude of her dissonance. For example, Susan could seek information that suggests eating meat is essential to good health, while actively avoiding information that would contradict this position (Festinger, 1957). This strategy can also reduce dissonance and may be a relatively easy method of doing so. Lastly, the addition of new cognitions could allow Susan to reduce the importance of her attitudes toward farm animals by reasoning that the treatment of other humans is more important, and hence her treatment of farm animals is inconsequential (Cooper, 2007; Festinger 1957). Given the number of different ways that people can reduce dissonance, one aim of the current experiments was to begin understanding why people choose the reduction strategies they do.

Producing Cognitive Dissonance in the Laboratory

The first experimental and peer-reviewed evidence to support the theory of cognitive dissonance was published in 1956 by Jack Brehm, a PhD student of Leon Festinger (Cooper, 2007, p.10). For his dissertation, Brehm (1956) devised a dissonance-arousing scenario now referred to as the free choice paradigm. His experiment provided participants with a decision-making task designed to produce postdecision dissonance, because people's choices can have both advantages and disadvantages. If presented with two alternatives, all of the cognitive elements that support one's chosen alternative can be considered consonant cognitions, but all of the cognitive elements that support the unchosen alternative will then be dissonant cognitions (Brehm, 1956). Based on this reasoning, participants were asked to rate the desirability of eight products under the guise of consumer research. After rating the products participants were informed that they would receive one of the products as payment for their participation. At this point in the study, three dissonance conditions were created. Participants were led to believe that they could choose one product from a random pairing of two products; however, the researcher actually paired the products based on their rated desirability. In the *high dissonance* condition, a product rated highly desirable was paired with another highly desirable product (i.e., a product that was rated only 0.5 to 1.5 points lower than the former). In the *medium dissonance* condition the alternative product was always rated two points lower than the most desirable product, and in the *low dissonance* condition the alternative was rated three scale points lower. After rating the products and choosing one product to take home, participants were given various pieces of information about the products (this was a manipulation of cognitive elements that did not produce significant

findings) and then asked to re-rate the products. The results supported Brehm's hypotheses. On the second evaluation participants rated their chosen product as more desirable and the alternative product as less desirable, a phenomenon referred to as the spreading of alternatives. In addition, the results supported the prediction that participants would experience more dissonance when the products were almost equally desirable (i.e., in the high dissonance condition as evidenced by greater spreading of alternatives rather than a more direct measure of experienced dissonance).

Three years after the publication of Brehm's experiment came Festinger and Carlsmith's (1959) landmark peg-turning experiment. Counter to the behavioural climate of psychology during that time, Festinger and Carlsmith sought to determine whether privately believing one thing, but publicly saying another, created feelings of dissonance. Specifically, they predicted that an individual who said something contrary to what she or he personally believed would experience dissonance, and would seek to reduce this dissonance by altering her or his personal belief so that it aligned more closely with the public statement. Their prediction included an important point that ran counter to behaviourism and research concerning rewards. Festinger and Carlsmith hypothesized that, when a reward was offered to individuals to induce them to act in a way counter to their personal beliefs, a smaller reward would result in more attitude change than a larger reward. This may seem a puzzling hypothesis, but according to cognitive dissonance theory it made complete sense because providing a small reward and only sufficient pressure to comply leaves the participant questioning their behaviour and in a state of dissonance whereas providing a larger reward and more pressure to elicit the dissonant behaviour allows the participant to justify his or her actions.

Participants completed a very dull peg-turning task during the experiment. Afterwards, the experimenter recruited the participants as confederates for his study under the guise that his regular confederate was not available. The experimenter offered participants either one dollar or twenty dollars to convince the next participant that the task was interesting and enjoyable (i.e., to publicly state something contrary to the participant's beliefs). After completing this task participants were interviewed and asked to evaluate the experiment they just participated in as part of an evaluation project being conducted by the psychology department at Princeton University. The interview questions centered on whether the study was interesting, enjoyable, educational, of scientific importance, and if the participant would be willing to complete a similar experiment. Results indicated that participants in the one dollar condition reported that the experiment was more interesting than participants in the control and twenty dollar conditions. This result provided support for the researchers' hypothesis because participants given a larger reward to comply with the experimenter's request altered their personal opinion less than participants only offered one dollar to comply. Results for the other dependent variables were not statistically significant, and this was not surprising given that only the dependent variable that assessed interest and enjoyment was related to the dissonant behaviour of the participant (i.e., falsely reporting that the experiment was interesting and enjoyable to the next participant). Festinger and Carlsmith (1959) concluded that the results of their experiment strongly supported dissonance theory, as have hundreds of subsequent experiments.

Paradigms Used to Arouse Dissonance

Dissonance has been a topic of study in psychology laboratories for over 50 years, and during that time researchers have developed different ways to arouse dissonance among their participants. The original work of Brehm (1956) is known as the free choice paradigm and the classic experiment by Festinger and Carlsmith (1959) created the induced compliance paradigm, which is the most frequently used paradigm.

In addition to these well-known paradigms, researchers have aroused dissonance among participants through a process of effort justification. Studies using this paradigm (Aronson & Mills, 1959; Gerard & Mathewson, 1966) have revealed that individuals who expend much effort in the pursuit of an activity (e.g., joining a group) report liking that activity more than individuals who were easily able to partake in the activity, even when the activity is boring. By liking the activity more, individuals can rationalize the feelings of dissonance produced by the fact that they spent so much effort to join such an uninteresting activity or group.

In an attempt to use dissonance to effect prosocial changes in people's behaviour, Aronson developed the hypocrisy paradigm by turning the induced compliance paradigm on its head (Aronson, Fried, & Stone, 1991; Fried & Aronson, 1995). Instead of having participants comply with a counterattitudinal behaviour to produce dissonance (e.g., students writing in support of increased tuition fees), Aronson had participants publicly advocate a position they already supported and then reminded them that their own behaviour did not always conform to the stance they advocated. In essence, participants are made aware of their hypocrisy and this results in dissonance, which in turn leads to behaviour change as a way of reducing that dissonance. Researchers have successfully

used the hypocrisy paradigm to encourage people to conserve water (Dickerson, Thibodeau, Aronson, & Miller, 1992), increase recycling (Fried & Aronson, 1995), increase safe sex practices (Stone, Aronson, Crain, Winslow, & Fried, 1994), and to encourage the use of sunscreen (Fernandez, Stone, Cascio, Cooper, & Hogg, 2007).

Arousing different types of dissonance in the laboratory may result in different levels of dissonance and the preference for different reduction strategies. For example, because the hypocrisy paradigm is self-relevant it may arouse a great deal of guilt, which may motivate behaviour change more than post-decisional dissonance, where behaviour change is not even an option. Studies have yet to compare the effects of these different paradigms on dissonance magnitude, the affective quality of the dissonance, and the use of dissonance reduction modes.

Measuring Dissonance

The experience of dissonance has been described as a state of tension and arousal that is psychologically uncomfortable (Devine, Tauer, Barron, Elliot, & Vance, 1999). The description of dissonance as a psychologically aversive state is critical to the theory of cognitive dissonance because researchers have argued that it is this uncomfortable state that motivates individuals to reduce their dissonance through various reduction strategies. Given the central importance of this affective state to the theory of cognitive dissonance, one may assume that early researchers thoroughly measured and validated the actual experience of dissonance; however, this was not the case. Cognitive dissonance theory developed at a time when researchers created black box models to explain their data (Cooper, 2007, p. 61). Questions concerning the inner workings of such models were not investigated. So, although Festinger proposed that dissonance was experienced as a

discomforting motivational state, few social psychologists actually tested this assumption. Instead, researchers have relied heavily on participants' use of dissonance reduction strategies, in experimental conditions compared to control conditions, to infer that dissonance had indeed been aroused (Devine et al., 1999). For example, under the induced-compliance paradigm the experience of dissonance has typically been inferred from changes in participants' attitudes. Likewise, in the free-choice decision-making paradigm dissonance is inferred from increases in the value of a chosen alternative and the devaluation of the non-chosen alternative. Such studies provide results that are theoretically consistent with dissonance theory, but these results do not provide direct evidence of a dissonant experience characterized by arousal, tension, and discomfort. Furthermore, there was no evidence to substantiate the claim that dissonance reduction strategies (e.g., attitude change) actually relieve feelings of tension and discomfort. Noticing the need for such evidence several researchers devised methods to measure and validate individuals' experiences of dissonance (Cottrell & Wack, 1967; Croyle & Cooper, 1983; Elkin & Leippe, 1986; Elliot & Devine, 1994; Fazio, Zanna, & Cooper, 1977; Losch & Cacioppo, 1990; Pallack & Pittman, 1972; Waterman & Katkin, 1967; Zanna & Cooper, 1974).

Evidence for the property of arousal. One of the earliest studies designed to explore the arousal component of dissonance did so by examining whether dissonance, assumed to be characterized by arousal, affected participants' learning. Waterman and Katkin (1967) reasoned that if dissonance involved arousal it should replicate the well-established finding that arousal facilitates learning on simple tasks but interferes with learning on more complex tasks (Cooper, 2007). Participants wrote either a counter-

attitudinal essay or an attitude-consistent essay about a personally relevant and important issue on their campus. It was hypothesized that participants who wrote the counter-attitudinal essay would consequently experience dissonance and its associated arousal and perform better on a simple cognitive task (i.e., symbol substitution) when compared to participants who did not write dissonance inducing counter-attitudinal essays. Furthermore, the opposite relationship was expected for the completion of a more difficult cognitive task, such that participants experiencing dissonance would perform worse on this task compared to participants who were not experiencing dissonance. In fact, participants in the dissonance-inducing condition actually performed better on both simple and complex tasks when compared to participants not experiencing dissonance. The authors suggested that insensitivity of the dependent variables may have obscured the hypothesized dissonance by task difficulty interaction. Although these results did not follow the initial predictions exactly, the authors suggested that dissonance is experienced as a drive that produces energizing effects. However, further evidence was needed to justify this claim.

Other researchers have approached the measurement of dissonance arousal using a misattribution paradigm. Zanna and Cooper (1974) convinced participants from Princeton University that they were completing a study about the effect of a drug on memory performance. Participants were randomly assigned to one of three groups that were led to believe that the drug had no side effects, a relaxing side effect, or an arousing side effect. The drug was actually a placebo, and participants were asked to write a counterattitudinal essay while supposedly waiting for the effect of the drug to begin. As expected, participants who believed they took an arousing drug did not change their

attitudes because they attributed their arousal to the side effects of the drug. Conversely, participants placed in the neutral and relaxing side effects groups did change their attitudes toward the position they advocated in their essays because they had no alternate way to explain their feelings of unpleasant arousal. That is, they could only attribute their arousal to the inconsistency produced during the induced compliance task in which they advocated a position they did not actually believe (i.e., raising tuition fees at Princeton University). Although this creative study provided evidence consistent with the negative arousal state of dissonance, only direct measures can elucidate exactly how dissonance is experienced.

The first direct evidence of the arousal component of dissonance was collected from participants whose nonspecific skin conductance responses were recorded while they completed an induced compliance task (Croyle & Cooper, 1983). Participants randomly assigned to the high dissonance condition showed elevated levels of physiological arousal when compared to participants who were not placed in a dissonance-producing situation. In another study, participants who experienced dissonance after writing a counter-attitudinal essay displayed increased levels of arousal as indicated by galvanic skin responses in comparison to participants placed in a low dissonance condition (Elkin & Leippe, 1986).

Evidence for the aversiveness of dissonance. While the above studies indicate that dissonance is characterized by arousal, they do not provide evidence that this experience is aversive or psychologically uncomfortable. In order to determine the exact motivating properties of dissonance, Losch and Cacioppo (1990) conducted a misattribution study that, while similar to the study conducted by Zanna and Cooper

(1974), also clarified the role of unpleasantness in the experience of dissonance (Cooper, 2007).

The participants in Losch and Cacioppo's (1990) study were ostensibly recruited to wear perception-altering prism goggles prior to completing various cognitive tasks while having their physiological responses recorded. Participants were placed in a comfortable room for three minutes while wearing the prism goggles. After removing the goggles participants were told that it would take 15 minutes before their vision returned to normal and that this return would be accompanied by a feeling of either pleasant excitement or unpleasant tension. This manipulation constituted the misattribution source and the placement of participants into either the positive cue or negative cue conditions. Participants were then given filler tasks to complete for 10 minutes, during which their skin conductance responses were measured to obtain baseline data. Once the filler tasks were complete the researcher introduced the dissonance-arousing task, which involved creating arguments in support of the use of electric shock research in the psychology department at their university. Participants were randomly assigned to either a high or low choice condition at this point in the study.

Once again, researchers found evidence that supports the assertion that dissonance causes physiological arousal. Participants in the high choice condition demonstrated a higher frequency of nonspecific skin conductance responses following their decision to complete the attitude-discrepant task compared to participants placed in the low choice condition. Additionally, results based on the misattribution source created by the researchers confirmed their second prediction concerning the valence of participants' arousal. Their reasoning was that, if people reduce dissonance merely to end their

experience of an arousing state, then high choice participants in both the positive and negative arousal cue conditions should act to reduce their dissonance by developing more positive attitudes toward the use of electric shock. However, if dissonance reduction requires an aversive arousal state, then only participants in the positive cue condition should feel the need to change their attitudes because they cannot misattribute their aversive arousal to the removal of the prism goggles. In line with this prediction, participants placed in the positive cue condition, who freely chose to support the use of electric shock in experiments, changed their attitudes the most regarding the use of electric shock in psychology experiments. That is, they favored the use of electric shock more than participants in the negative cue condition as a way to reduce their feelings of dissonance because those feelings could not be misattributed to the supposed effects of the prism goggles.

Self-reports of dissonance: The dissonance thermometer. Perhaps the most convenient way to measure dissonance is to simply ask participants to report how they feel after completing a dissonance-inducing task. Elliot and Devine (1994) had participants complete a dissonance self-report measure at different times during a cognitive dissonance experiment. Based on Festinger's writing, their intuitions regarding the experience of dissonance, and research on affective states, they constructed the *dissonance thermometer* to both measure the psychological experience of dissonance and separate this experience from the experience of other negative emotions. The discomfort index of their scale included items assessing the extent to which participants felt uncomfortable, uneasy, and bothered. The negative self index of this scale was formed by averaging participants' ratings of disappointment, annoyance, guilt, and being self-

critical, and the positive index measured the extent to which participants felt good, happy, optimistic, and friendly. All the scales demonstrated good internal consistency.

Participants were randomly assigned to one of four conditions. Two groups of participants were given high choice to complete a counterattitudinal essay supporting a tuition increase. The only difference between these two conditions was the timing and order of the completion of the dissonance thermometer and the attitude self-report measures. In one condition, participants completed the dissonance thermometer followed by an attitude measure after agreeing to write the essay, whereas in the other condition participants completed the attitude measure followed by the dissonance thermometer after completing the essay. The different order allowed the researchers to assess dissonance levels before and after the use of the attitude change reduction strategy. A baseline condition was also established to measure participants' initial affective responses using the dissonance thermometer before the completion of the counterattitudinal essay, and a proattitudinal essay condition was created to measure the affective experience and attitudes of participants not experiencing dissonance.

Importantly, the significant findings from this study relate solely to the discomfort index of the dissonance thermometer as no significant effects were observed for the other two indices, suggesting that dissonance involves an experience of discomfort that is distinct from other negative affective states.¹ Participants who completed the dissonance thermometer first, reported more discomfort than participants in the pro-attitudinal and baseline conditions, replicating the typical dissonance finding. Participants in the dissonance thermometer first condition also reported more discomfort than participants who completed the attitude measure before the dissonance thermometer. This finding

¹ A second study using factor analysis confirmed the structure of the discomfort index used in Study 1.

supports the long-held assumption that attitude change is a strategy used by people to reduce a dissonant experience.

Devine and colleagues (1999) suggest that using the dissonance thermometer in experiments may prove more fruitful in understanding dissonance reduction than a physiological measure of arousal because after using a reduction strategy participants may feel immediate affective relief, but not immediate physiological relief, which is to say that they may still be aroused (Elkin & Leippe, 1986). Furthermore, the thermometer can provide important qualitative information about the affective nature of dissonance. It is quite possible that different induction procedures may arouse different types of dissonance. For example, Aronson (1992) believes that using the hypocrisy paradigm to induce dissonance will lead participants to experience guilt, because this procedure makes an individual question her moral sense of self. By comparison, a procedure such as the free choice paradigm would likely lead to a more global sense of discomfort because aspects of the self are not involved; the participant simply needs to choose between two desirable objects. Yet, only by using a measure such as the dissonance thermometer will researchers learn how different induction procedures lead to different experiences of dissonance.

Given the usefulness of this self-report measure additional studies need to be carried out to determine if and when participants are experiencing dissonance in the laboratory (an important manipulation check), and how different reduction strategies affect one's level of dissonance. The dissonance thermometer was used in the current research as a way to measure dissonance levels following the completion of a dissonance-inducing task and then again following the completion of a dissonance reduction strategy.

Measuring dissonance both before and after the use of a reduction strategy will provide valuable information on the effectiveness of different reduction strategies and whether the choice of a reduction strategy varies based on the level of dissonance experienced by participants. Lastly, incorporating a pre-post measure of experienced dissonance is important for theory refinement because the majority of dissonance experiments rely only on attitude change as an indicator of dissonance reduction, which provides little information on one's actual level of experienced dissonance (for notable exceptions that include pre-post measures see Devine et al., 1999; Elkin & Leippe, 1986).

Models of Dissonance

Although the question of how dissonance is experienced has been put to rest, since Festinger's original formulation of dissonance theory several researchers have proposed alternative dissonance models that vary to different extents from the original model. Some researchers have suggested that dissonance is not aroused by inconsistent cognitions (Cooper & Fazio, 1984) while others have sought to determine exactly why inconsistent cognitions arouse feelings of dissonance (Aronson 1969; Harmon-Jones, 1999). Although this research did not seek to test the propositions of these various models, a brief review of these models helps to situate the current understanding of dissonance among social psychologists. As such, three of the more popular and challenging revisions and extensions are reviewed below.

Aronson (1968, 1999) was one of the first researchers to propose a modification to dissonance theory, and it is a modification that has demonstrated staying power. Aronson (1999) has recalled having disagreements with Festinger over particular situations and whether such situations would produce dissonance. Festinger believed that

a man standing outside in the rain while not actually getting wet would experience dissonance because he holds two discrepant cognitions (i.e., “I am standing in the rain but I am not wet.”). Conversely, Aronson believed that this situation would not produce dissonance because it does not hold any relevance to the man’s self-concept and would simply be perceived by the man as a strange phenomenon, unless of course the man began to question his sanity. Aronson (1999) argues that most people try to maintain a consistent and positive sense of self, and that because of this people want to act competently, morally, and be able to predict their behaviour. Dissonance results from actions that leave people questioning their competency or morality or with a feeling of confusion (Aronson, 1999). Therefore, Aronson contends, the classic experiment by Festinger and Carlsmith (1959) aroused dissonance in participants because they acted immorally by lying to a fellow participant and likely experienced guilt over that act (e.g., “I am a good person, but then why did I lie to that participant for a mere dollar?”).

One bold reconceptualization of dissonance theory came from the New Look version of dissonance (also known as the aversive consequences model) (Cooper & Fazio, 1984). This alternative dissonance theory was considered bold because it moved the emphasis of the theory away from inconsistencies and toward the production of aversive consequences. That is, dissonance is aroused in individuals because acting in a counter-attitudinal manner can result in foreseeable negative consequences. For example, under this new model of dissonance participants in the original Festinger and Carlsmith (1959) experiment experienced dissonance because they lied to other participants and this lying resulted in the new participants being excited for what was ultimately a boring experiment. Evidence to support this argument came from a study that demonstrated that

removing the aversive consequence from the experimental situation (i.e., the new participant listens to the confederate but then states that she still believes the study will be boring) resulted in no dissonance (Cooper & Worchel, 1970). However, despite the results from this study and others, some scholars do not believe that the New Look version advances dissonance theory. Aronson (1999) believes that it limits the scope of the theory without providing gains in accurate predictions, and others have even demonstrated that the production of aversive consequences is not necessary to produce dissonance (Harmon-Jones, Brehm, Greenberg, Simon, & Nelson, 1996).

After presenting evidence that aversive consequences are not necessary to produce dissonance, Harmon-Jones (1999, 2000) proposed an Action-Based Model of Cognitive Dissonance to answer questions about why inconsistency is both motivating and experienced as a negative affective state. In this model cognitions are thought of as action tendencies, and the presence of cognitive inconsistency can interfere with one's ability to act effectively. It is this interference with action that arouses a negative emotional state. According to the Action-Based Model (Harmon-Jones & Harmon-Jones, 2008) dissonance is reduced for two reasons. People are motivated to reduce dissonance because it is affectively unpleasant but also because the presence of inconsistent cognitions interferes with our need for effective action. This model of dissonance is appealing because while remaining true to the original theory it also addresses the important question of why inconsistency produces negative affect and acts as a motivating drive. Initial findings on the action-based model provide supportive evidence for this theory, but additional studies still must be carried out. Harmon-Jones and Harmon-Jones (2002) found that participants primed with an action-oriented mindset re-

rated their decision options more extremely (i.e., showed a greater spreading of alternatives) than participants primed with a neutral mindset. This result was anticipated because once a decision has been made individuals focus on carrying through with that decision by means of unconflicted and effective action. A difficult decision (e.g., choosing between two equally desirable tasks or products) may arouse dissonance and in order to successfully implement one's decision and effective behaviour a dissonance reduction process will be necessary. Harmon-Jones and Harmon-Jones (2002) maintain that an action-oriented mindset increases discrepancy reduction because it allows the individual to focus on ways to turn a decision into action, and not because an action-oriented mindset increases negative affect by highlighting the importance of dissonant cognitions or increasing one's perception of aversive consequences. To demonstrate this point the researchers tested a mediation model with manipulated mindset as the predictor, spreading of alternatives as the outcome, and negative affect as the mediator.

Nonsignificant results from this analysis are interpreted as further evidence that an action-oriented mindset leads to increased discrepancy reduction as a means of transforming decisions into unconflicted action, and that other explanations provided by competing theories are less relevant. However, this conclusion is based on a null finding, and elsewhere Harmon-Jones and Harmon-Jones (2008) have noted the difficulty of interpreting null effects. Furthermore, it is unlikely that the authors would have achieved significant mediation effects with a sample of only 43 participants. To have adequate power in a mediation analysis researchers are advised to have samples of 200 to 500 participants (Frazier, Tix, & Barron, 2004). Therefore, additional studies on the action-

based model of cognitive dissonance are warranted to determine if people experience dissonance because inconsistency interferes with effective action.

Dissonance Reduction Strategies

Festinger (1957) initially proposed three common ways of reducing dissonance: changing one's cognitions (thereby decreasing the number of dissonant cognitions), creating new consonant cognitions, or minimizing the importance of dissonant cognitions (and/or by increasing the importance of consonant cognitions, as suggested by Harmon Jones [2000]). As research on dissonance continues to grow, specific reduction strategies have been catalogued.

Attitude change. The mode of dissonance reduction that has received the most empirical attention is changing a cognition (broadly defined by Festinger as any piece of knowledge), and specifically the changing of one's attitude. Although attitude is just one of several cognitions that could be changed to reduce dissonance, researchers have relied heavily on this construct, perhaps because it was the dependent variable in Festinger and Carlsmith's (1959) seminal work. After experimentally arousing dissonance, participants' attitudes are typically measured using a series of Likert type scales. For example, if participants just wrote an essay supporting a tuition increase they would complete items assessing their actual support for a tuition increase and these ratings would be compared to either their pre-experimental ratings or the ratings of participants in a control group that did not experience the dissonance induction and who would, therefore, have no reason to change their attitudes. While attitude change has been used as a reliable indicator of dissonance, several researchers note that dissonance theory has been constricted by researchers' over-reliance on this dependent variable (Devine et al., 1999;

Leippe & Eisenstadt, 1999; Simon, Greenberg, & Brehm, 1995; Wilder, 1992). Festinger (1999) highlighted the importance of this himself, writing “in the ordinary world and if the experimenter is not very careful, a little bit sloppy, there are lots and lots of avenues of dissonance reduction, and those have never been explored. I still think that one of the major avenues of dissonance reduction is to change your behaviour” (p. 384).

In addition to limiting how dissonance is measured, examining solely attitude change as a dissonance reduction strategy tells us very little about how individuals may actually deal with dissonant experiences. Festinger proposed that individuals can reduce dissonance through multiple pathways, but the dissonance literature, to its detriment, is largely centered on attitude change.

Distraction and forgetting. Unfortunately, the limited ecological validity of dissonance experiments has masked how easy it may be for people to reduce the negative arousal resulting from dissonant cognitions. When researchers moved away from measuring participants’ attitudes immediately after they had completed a dissonance-inducing task, they discovered that dissonance could be reduced simply through distraction (Zanna & Aziza, 1976) or forgetting (Elkin & Leippe, 1986). Distraction allows individuals to divert their attention away from their dissonant cognitions and avoid the negative affective state caused by dissonance. Conversely, presenting participants with an attitude change opportunity may actually be a less efficient reduction strategy because this reminds participants about their dissonance. Consistent with this possibility, Elkin and Leippe (1986) found that dissonance (as measured physiologically) did not decline following an attitude change opportunity, but did decline when participants were left to forget about the dissonance.

Trivialization and self-affirmation. Although Festinger (1957) described trivialization as one of three dissonance reduction strategies, decreasing the importance of dissonant cognitions was not empirically investigated as a reduction mode until almost 40 years after the publication of cognitive dissonance theory. Simon et al. (1995) investigated the conditions under which trivialization was a likely mode of dissonance reduction. Trivialization was presented as a reduction mode to participants by asking them to respond to four questions about the importance of their counter-attitudinal behaviour (i.e., writing an essay in support of mandatory comprehensive finals). Through a series of experiments, the researchers found that participants used the first mode of dissonance reduction presented to them unless their prior attitude had been made salient or they were given a trivializing issue frame, in which case participants were more likely to trivialize the importance of their behaviour rather than change their attitude.

Simon et al. (1995) also hypothesized that engaging in self-affirmation leads to trivialization and that trivialization is the process through which self-affirmation reduces dissonance. Self-affirmation, which occurs when participants' important values are made salient to them, is a dissonance reduction strategy originally tested by Steel and Liu (1983). Steele (1988) thought that dissonance could be reduced indirectly by self-affirmation because it allows an individual to reassert a sense of self-integrity. Research suggests that self-affirmation reduces dissonance through trivialization (Simon et al., 1995). Once an individual reaffirms her sense of self, the importance of a discrepant act is weakened and it no longer arouses dissonance.

Denial of responsibility. Responsibility is typically regarded as necessary for the experience of dissonance, and the denial of responsibility has also been suggested as a

dissonance reduction strategy (Festinger, 1957, p. 44). This proposition has also been examined empirically (Gosling, Denizeau, & Oberle, 2006). In a set of experiments, participants who had been presented with different modes of dissonance reduction following a counter-attitudinal behaviour selected the option first made available to them, one of which was denial of responsibility. Affective ratings reported by participants using Elliot and Devine's (1994) self-report dissonance measure indicated that negative affect was reduced following denial of responsibility. Furthermore, although participants denied responsibility for their behaviour when this option was presented first, they also used denial, albeit to a lesser degree, when it was presented second after trivialization. Because participants still used denial of responsibility as a second mode of reduction, the authors suggested that the denial of responsibility may be a stronger form of dissonance reduction than trivialization (which was the mode presented first to half of the participants). Alternatively this may depend on the type of negative affect aroused by the dissonance induction. In Experiment 3 participants showed greater reductions in negative self-directed affect rather than discomfort, suggesting that the denial of responsibility may be a particularly appropriate way of reducing dissonance associated with feelings of shame and guilt (Gosling et al., 2006).

In this set of experiments, the authors conceptualized the denial of responsibility as a dissonance reduction mode independent of external justification. Specifically, they defined the denial of responsibility as simply believing that something is not one's fault, without cognitively elaborating on this belief by assigning blame or responsibility to another party (i.e., a form of external justification). Gosling et al. (2006) believe that holding someone else accountable for your actions is a more complex process that may

occur after denying responsibility as a way to justify the denial of responsibility.

However, given the nature of the three denial of responsibility items used in this research (e.g., “Do you personally feel responsible for what you have just done?”) it is impossible to determine whether participants behaved according to this strict definition of denial because, unknown to the researchers, the participants may have cognitively elaborated their denial (e.g., it’s not my fault because the researcher wanted me to do it; it’s not my fault because this was the only option presented to me). Moreover, individuals who deny responsibility for a particular action presumably have a reason for doing so (e.g., it’s not my fault because...). Despite Gosling et al.’s (2006) suggestion, it is likely that denial of responsibility and external justification act in tandem, and that it is not necessary to limit the reduction mode of denial of responsibility to a simple “it’s not my fault” statement. In the context of the current studies, this dissonance reduction strategy was seen as particularly relevant to the issue of consuming factory farmed food as people may find it easy and sensible to deny responsibility for the suffering of animals and hold farmers responsible for the (mal)treatment of livestock.

Adding consonant cognitions. Rationalizing inconsistent behaviour by adding behaviour-consonant cognitions to one’s belief system is a relatively effortless method of reducing dissonance. People do this when they seek out new information to support their position, and research on selective exposure has explored how engagement in this process reduces dissonance (Cotton, 1985; Frey, 1986). For example, participants experiencing dissonance over writing counter-attitudinal essays in support of nuclear power plants sought out more supportive information (i.e., brochures on nuclear power plants) than participants experiencing low levels of dissonance (Cotton & Hieser, 1980). Similar

findings have been found for groups of smokers (Brock & Balloun, 1967) and for participants who choose to continue a boring experiment (Frey & Wicklund, 1978).

Looking for ways to externally justify one's behaviour is also a process of adding consonant cognitions. If a participant in an induced compliance experiment does not feel that he freely chose to commit a counter-attitudinal act then he can easily justify his behaviour by adding the consonant cognition "the researcher made me do it" to his cognitive web. Similarly, to overcome the dissonance produced by smoking (e.g., "I smoke but it is harmful to my health") smokers may add the cognition "everything causes cancer" to their belief system.

Changing behaviour. While considerable research has examined attitude change as a mode of dissonance reduction, little research has documented behaviour change as a dissonance reduction strategy. When looking back on dissonance research, Festinger (1999, p.384) wrote, "I still think that one of the major avenues of dissonance reduction is to change your behaviour." Although a major route of dissonance reduction, changing one's behaviour requires effort and is often not the most convenient way to reduce dissonance, especially in laboratory experiments employing the free choice paradigm because behaviour change is not an option to reduce post-decisional dissonance. According to Festinger (1957), behaviour may be resistant to change because it could be painful, otherwise satisfying, or simply impossible to do so.

Some dissonance studies have included behaviour change as a dependent variable with promising results for those interested in using dissonance arousal as a mechanism for positive behaviour change. Researchers have found that participants are more willing to conserve water (Dickerson et al., 1992), purchase condoms (Stone et al., 1994), accept

sunscreen (Fernandez et al., 2007), volunteer (Fried & Aronson, 1995), and comply with speed limits (Fointiat, 2004) when experiencing dissonance in an effort to reduce that aversive state. Importantly though, the behavioural reduction options presented to participants are sometimes the only options presented, which tells us little about whether people would actually change their behaviour to reduce dissonance when other reduction modes are accessible.

Shortcomings of Dissonance Theory

One criticism of dissonance researchers concerns the fact that they typically provide participants with only one way of reducing the dissonance they experience in laboratory experiments, and this strategy usually involves attitude change (Simon et al., 1995; Wilder, 1992). The dominant paradigm used to test dissonance theory is the induced compliance paradigm in which participants are asked to write counter-attitudinal essays. After completing this dissonance-arousing task, participants are given the opportunity to reduce the dissonance they experience by altering their attitude so it is consistent with the position they argued for in their essay. However, providing participants with just this one dissonance reduction strategy tells us little about how people actually reduce dissonance in their daily lives.

Relevant to how people may go about reducing dissonance in their daily lives are the findings of studies examining individuals' preferred dissonance reduction strategies (Gosling et al., 2006; Gotz-Marchand, Gotz, & Irle, 1974; Simon et al., 1995; Starzyk et al., 2009). For example, researchers have discovered that the first reduction strategy provided to participants is typically the preferred reduction strategy. Unfortunately, these studies still leave many unanswered questions about spontaneous dissonance reduction

outside the laboratory. In particular, studies that have included trivialization, the denial of responsibility and attitude change as dissonance reducing options present participants with these options serially, which tells us little about individuals' actual use of dissonance reduction strategies outside the laboratory environment. Researchers have yet to offer multiple dissonance reduction strategies to participants simultaneously (for two exceptions see Gotz-Marchand et al., 1974; Stone, Wiegand, Cooper, & Aronson, 1997), thereby not dictating the participant's choice of strategy. Furthermore, few studies have examined how attitude importance is related to the use of reduction strategies (for notable exceptions see Devine et al., 1999; Eisenstadt & Leippe, 2005; Starzyk et al., 2009).

Our lack of knowledge regarding spontaneous dissonance reduction is a serious limitation, particularly if we hope to apply the principles of dissonance to situations outside the laboratory. As an example, health education programs may include dissonance- arousing information or tactics, but if such programs are designed to influence people's beliefs and behaviour through inducing dissonance, we need to know more about how individuals resolve that experience of dissonance. For example, when a smoker buys a cigarette package bearing a photo of grossly diseased lungs, does she actually resolve to quit smoking or, alternatively, does she try to avoid the sight of the picture or does she convince herself that her lungs will be fine?

Festinger (1999) believed that understanding the multiple pathways to dissonance reduction was equally important as understanding the conditions necessary to arouse dissonance. When reviewing the vast amount of dissonance research it becomes apparent that too much attention has been paid to the arousal of dissonance and not enough to the reduction of dissonance. This is particularly peculiar given that Festinger defined

dissonance as a motivating force. People are motivated to reduce the aversive arousal produced by inconsistent cognitions, and yet we have little understanding of how people most often reduce dissonance and how often people even engage in reduction strategies. This research was designed to address some of these issues.

Toward a Model of Dissonance Reduction

Festinger's original work provides scant information on determining when one mode of dissonance reduction is likely to be chosen over another. He noted the importance of effort in dissonance reduction and suggested that behaviour will often be the most resistant to change and therefore the least frequently chosen option. Hardyck and Kardush (1968) created a model of dissonance reduction by taking into account effort and other potentially important factors. They categorized different dissonance reduction strategies and proposed a model of dissonance reduction that would allow for predictions regarding preferred reduction modes. Hardyck and Kardush (1968) suggested that all dissonance reduction modes fall into one of three categories, "stopping thinking, changing one element of the two that are in the dissonant relationship, and restructuring" (p.685). As a fourth option, people may choose to tolerate rather than reduce low levels of dissonance. Stopping thinking can involve passively forgetting the dissonance (as in the case of unimportant cognitions) or actively forgetting in the form of suppression (for more important cognitions). The largest number of reduction modes fall into the changing cognition category and include strategies such as denial of responsibility, belief and attitude change, and distorting the content of the dissonant cognition. Lastly, restructuring involves creating more complexity between the dissonant cognitions, adding consonant cognitions, or doing cognitive work to make the dissonant relations between cognitions

appear irrelevant. Because more effort is required as one moves from forgetting to changing cognitions and on to restructuring, forgetting will be the preferred method of reducing dissonance. Forgetting will also be the preferred mode because, although a temporary solution, it is the most efficient way of reducing dissonance. In contrast, restructuring is the most precarious way of reducing dissonance because it reduces rather than eliminates dissonance.

To aid in the prediction of reduction mode preference, Hardyck and Kardush (1968) provided a graph (see Appendix A) in which the importance of cognitions is plotted against the amount of use of a reduction mode, with each mode represented by a different line in the graph. For relatively unimportant cognitions, those not valued by the individual, passive forgetting is the likely strategy, and as the cognitions increase in importance active forgetting becomes more likely. For moderately important cognitions, any of the three reduction categories are probable and it is also possible that people will engage in more than one strategy (assuming they are not forgetting the dissonance). Cognitions of high importance will be restructured and those of the most importance will be actively suppressed. In reviewing Hardyck and Kardush's model, Leippe and Eisenstadt (1999) conceptualized the different modes of dissonance reduction as falling on a continuum of elaboration, similar to models of persuasion, that ranges from passive forgetting to categorical change and on to cognitive restructuring.

Hardyck and Kardush's (1968) and Leippe and Eisenstadt's (1999) discussions of the use of dissonance reduction strategies as a function of issue importance did not consider situational factors that may influence people's preferences for different dissonance reduction strategies. For example, a smoker would probably be unable to

forget about the dissonance she experiences when her physician confronts her with information about the effects of smoking on longevity. Additionally, it would be difficult to discredit the dissonant information presented from such a credible source, whereas this may be a more likely dissonance reduction strategy if being lectured by a child. Hardyck and Kardush (1968) also briefly mention individual differences (age, education level, flexibility, tolerance of ambiguity) that may affect the choice of reduction mode. For example, higher levels of cognitive complexity may be associated with more use of restructuring and less use of forgetting.

Although Hardyck and Kardush's (1968) model helped refine our understanding of dissonance reduction, models of dissonance reduction are still in their infancy because no empirical work has been directed at supporting or refuting this model. It is also curious that Hardyck and Kardush (1968) conceptualized behaviour change as being equivalent to other cognitive changes, whereas Festinger (1957) differentiates between behavioural changes and cognitive changes tied to one's environment. Given these limitations, research examining dissonance reduction strategies will provide valuable information about the utility of Hardyck and Kardush's (1968) model and potentially important refinements.

Magnitude of Dissonance as a Function of Attitude Importance and Salience

From Festinger's original formulation it is understood that the magnitude of dissonance increases as the number of discrepant cognitions increase and as the importance of the cognitions increases. However, since the development of the dissonance thermometer empirical explorations of how importance is actually related to the magnitude of dissonance experienced are minimal (for exceptions see Devine et al.,

1999; Eisenstadt, Leippe, Rivers, & Stambush, 2003; Eisenstadt & Leippe, 2005; Starzyk et al., 2009). Furthermore, because so many induced compliance experiments rely on attitude change as evidence for the experience of dissonance, determining the relationship between importance and dissonance magnitude has not been a central concern of researchers, let alone how importance and magnitude affect reduction modes. That is, do highly important discrepant cognitions arouse high levels of dissonance and do individuals expend more effort in reducing this state (versus a low level of dissonance) by engaging in more elaborate reduction modes? The current experiments sought to address these questions by examining the relationship between attitude importance and self-reported levels of dissonance, together with choice of dissonance-reduction strategy.

Starzyk et al. (2009) recently documented how the use of dissonance reduction strategies differ depending on the *salience* of attitude importance. According to them, prior findings of studies of the effects of attitude importance on attitude change following a dissonant experience were inconsistent (Eisenstadt & Leippe, 2005; Shaffer, 1975). Such inconsistencies are not, perhaps, very surprising. Indeed, on one hand, important attitudes may be particularly *sensitive* to inconsistencies. With a highly important attitude, attitude-inconsistent behaviour could lead to high levels of both dissonance and attitude change to resolve the dissonance. It is equally plausible, however, for a highly important attitude to be more *resistant* to the effects of dissonance-induction, resulting in relatively low levels of attitude change following inconsistent behaviours.

Starzyk et al. (2009) argued that the *salience* of attitude importance matters, rather than simply attitude importance alone. In their research, salience moderated the relationship between attitude importance and attitude change. Specifically, participants

(with low, moderate, and high levels of attitude importance) who were not reminded of the importance of their attitudes toward government-funded student loans demonstrated equal levels of attitude change regardless of the importance of their attitudes. Yet when given an additional opportunity to trivialize the importance of their attitudes, only those with highly important attitudes did so. Presumably, participants with the strongest attitudes experienced the most dissonance by completing the counter-attitudinal act (i.e., writing an essay against government-funded student loans) and therefore used trivialization as an additional way of reducing their feelings of dissonance following an opportunity that already allowed them to change their attitudes. By comparison, participants who were reminded of the importance of their attitudes changed their attitudes less, with attitude importance inversely related to attitude change. And after changing their attitudes participants in this condition did not trivialize their attitudes significantly more than participants in the control condition, regardless of the level of attitude importance.

Starzyk and colleagues (2009) concluded that past conflicting findings regarding attitude importance and dissonance reduction can be partly accounted for by the role of salience. When an important attitude is made salient individuals are less likely to reduce dissonance by changing that attitude or trivializing it. Instead they may look to other ways of reducing their dissonance (e.g., attitude bolstering or external justification). In the current studies the salience of attitude importance was not manipulated as I was not interested in measuring attitude change, but there is reason to believe that participants were aware of their attitude favourability and importance because the attitude object is a social issue (i.e., animal welfare) well known to people (Starzyk et al., 2009). Given this

issue, it is unlikely that participants experienced much ambiguity about their personal opinions on the topic. In the present studies I attempted to determine how cognitive importance (here defined as attitude importance) affects the magnitude of dissonance experienced and the selection of a reduction mode. When attitude importance has been measured in dissonance studies, researchers often have not used direct means of measuring dissonance (Leippe & Eisenstadt, 2005). And when they have (Elliot & Devine, 1994), attitude importance has been measured during the experiment, which can give an inaccurate rating of importance because participants may downplay the importance of their attitudes during the study to reduce dissonance. Addressing the role of attitude importance in the dissonance process has received little attention (Leippe & Eisenstadt, 2010), especially given its theorized central role in the arousal of dissonance. Attitude importance was included as a main variable in the current studies because the development of a more complete understanding of cognitive dissonance from induction to reduction necessitates unearthing the potential influence of importance.

Applying Dissonance Induction

Animal welfare groups, such as People for the Ethical Treatment of Animals (PETA), have a long history of presenting shocking information to the public through education campaigns. Their goal is to provide people with accurate and oftentimes gruesome information on the mistreatment of animals, in the hope that people will then stop supporting the industries that abuse animals. Videos that depict cruel animal treatment practices likely arouse disgust and sadness within viewers, but perhaps such videos also produce cognitive dissonance. For example, a viewer who watches, and is affected by, disturbing footage about factory-farmed pigs may feel dissonance because

she herself consumes pork products on a regular basis. When faced with these discrepant cognitions what is she most likely to do? Will she simply forget about the information, deny responsibility for the practice by blaming farmers, justify her behaviour because protein is a necessary staple of one's diet, or will she stop consuming pork raised from factory-farmed pigs? The proposed research hopes to begin answering these questions.

Presenting people with information by showing them disturbing video footage may arouse cognitive dissonance for different reasons. Firstly, the presentation of the information in itself should act as a discrepant cognition for those who care about animal welfare. Secondly, it may alert the individual to the aversive consequences of their consumption habits. Cooper and Fazio (1984) have argued that dissonance arises when people realize their behaviour produces aversive consequences. Although others believe aversive consequences are not necessary for one to experience dissonance (Harmon-Jones et al., 1996), it is possible that being aware of aversive consequences increases the likelihood that someone will experience dissonance or perhaps even the magnitude of that dissonance. Knowledge about the aversive consequences of one's actions is yet an additional discrepant cognition that could intensify one's feeling of dissonance. Lastly, it is possible that watching disturbing footage of tortured animals will arouse a state of negative affect within an individual, which could amplify feelings of dissonance.

Researchers have manipulated independent sources of negative affect in past dissonance experiments (Rhodewalt & Comer, 1979) and have found that increases in negative affect result in increased discrepancy reduction, which may mean that the participants' feelings of dissonance were amplified. Conversely, independently manipulating positive affect produces decreased discrepancy reduction; that is, it mutes the motivating drive of

dissonance. As such, manipulating negative affect with disturbing video footage that is directly related to the issue under consideration (i.e., cruelly treated chickens) should serve to increase feelings of dissonance, but whether such an increase in dissonance produces behavioural change has yet to be empirically studied. Experiment 2 included potentially disturbing video footage in an effort to increase overall dissonance levels among participants and to determine whether this manipulation had effects on the selection of dissonance reduction strategies.

Moderators of Dissonance

Inducing dissonance in the laboratory requires a well-designed procedure to ensure that participants attribute their arousal and negative affective state to their own behaviour rather than a variable unaccounted for by the researcher. However, even with a thoughtful and rigorous procedure in place the researcher may not find evidence of dissonance; among social psychologists it is a notoriously difficult effect to document (Cooper, 2010). In an effort to avoid this pitfall I measured variables that could obscure the dissonance effect. It was hoped that by statistically accounting for these variables the likelihood of documenting the expected effect would increase.

The presence of discrepant cognitions has varying effects on individuals, as not all individuals experience the same amount of dissonance, regardless of being exposed to the same situation. For example, Cialdini, Trost, and Newsom (1995) developed the Preference for Consistency (PFC) Scale to determine how people vary in their preferences for an internal state of balance. The preference for consistency is a personality trait and individuals high in this trait want new information to integrate well with existing information, whereas individuals low in this trait more readily accept new

information without being overly concerned with information based on past experiences or choices. Low ratings in preference for consistency are positively related to the trait of openness, meaning that such individuals are especially accepting of new stimuli.

Importantly, over half of the participants surveyed in the development of the PFC did not demonstrate a strong preference for consistency, which is an important fact to consider in the development of dissonance experiments. When placed in a forced compliance situation, participants low in PFC changed their attitudes in both the control and experimental conditions, which ultimately masked the expected dissonance finding that only participants in the experimental condition would change their attitudes as a means of reducing dissonance. Given this result, researchers conducting future dissonance experiments need to account for potentially confounding individual difference variables.

The role that self-esteem plays in the process of dissonance has been difficult to unearth. According to Aronson's self-consistency model of dissonance, people high in self-esteem should experience more dissonance when committing a counter-attitudinal behaviour than people with low self-esteem because they already have a positive view of the self, which should be threatened by an action that challenges the morality, competence, or rationality of that self. Conversely, people with low self-esteem should experience less inconsistency because the counter-attitudinal act does not present as great a challenge to their lowly regarded selves. However, Steele's (1988) self-affirmation model predicts the opposite pattern because people with high self-esteem should be able to ward off the effects of cognitive discrepancy by reassuring themselves about their goodness, whereas low self-esteem people are unable bolster their self-image in this way

and thus experience higher levels of dissonance. According to the Self-Standards Model of dissonance (Stone & Cooper, 2001), self-esteem only plays a role in dissonance when thoughts about the self are primed, and that most of the time people rely on normative standards to judge their behaviour, in which case self-esteem does not affect the arousal or reduction of dissonance. Given that the two studies followed the hypocrisy paradigm, which implicates the self in the arousal of dissonance, participants' self-esteem was measured.

Past research has demonstrated that extraversion can moderate dissonant experiences such that introverts experience more dissonance over discrepant information than extraverts (Matz, Hofstede, & Wood, 2008; Norman & Watson, 1976). Introverts may experience higher levels of dissonance because their nervous systems are more sensitive to arousal when compared to extraverts. In addition to examining how the Big Five personality traits may affect the process of dissonance, it was also worthwhile to consider the role that self-monitoring can play in cognitive dissonance.

Self-monitoring is a personality trait that describes how individuals act in various situations (Snyder, 1974, 1979). High self-monitoring individuals adapt their behaviour in interpersonal situations to what they perceive as desirable or appropriate whereas low self-monitoring individuals remain more constant in various social situations letting their actions stem from personal values and beliefs. In terms of dissonance, low self-monitors should experience more dissonance when behaving in a way that violates personal standards, whereas high self-monitors should experience more dissonance when behaving in a way that violates normative standards (DeBono & Edmonds, 1989). Given that the study employed the hypocrisy paradigm measuring self-monitoring was considered

important as low self monitors should feel heightened levels of dissonance by advocating a position they believe only then to admit they do not always act in accordance with that belief.

Overview of the Research

The current research is set in the context of a controversial animal welfare issue, namely the purchasing and consumption of eggs from battery-caged chickens. This issue has received considerable attention from animal welfare groups and scientists and has also made its way into the mainstream as eggs raised according to more ethical production standards are now available in many grocery stores throughout North America. Animal welfare advocates argue that production methods aimed at cutting costs leave battery caged chickens in deplorable living conditions under inhumane treatment (e.g., non-anaesthetized beak trimming, insufficient space to stand up and stretch wings, which can lead to osteoporosis and foot ailments, and respiratory problems and blindness resulting from ammonia produced from the accumulation of feces). Given this knowledge, some individuals may experience dissonance when purchasing and consuming these eggs and they may prefer to choose eggs produced by more humane means. Currently though, eggs not raised from battery-caged chickens makeup less than 5 percent of the market share in Canada (Canadian Coalition for Farm Animals, 2011). So the question remains, when confronted with this information how do people react? Do they experience dissonance and, if so, how do they resolve it? Specifically, cognitive dissonance theory is viewed as a relevant and potentially powerful theory that will provide one way of understanding why people do, or do not, choose to purchase ethically produced food. The topic of ethical food choices has received more research attention in

past years, but little of this research has investigated the potential role that cognitive dissonance may play in our food purchasing behaviours. By applying dissonance theory to this issue I hope to add to the literature in the area of human animal interaction.

Beyond applying dissonance theory to this topic, this research may also begin to fill in important gaps in the dissonance literature. Firstly, by including attitude importance in these studies we can develop a better understanding of how importance relates to the arousal of dissonance and the selection of a reduction mode. Secondly, by measuring dissonance directly with the dissonance thermometer, participants' experiences of dissonance from beginning to end can be tracked. And lastly, these studies focus on understanding the process of dissonance reduction in ways more akin to how dissonance reduction may operate in real life. Most past laboratory studies have provided participants with only one reduction strategy, typically attitude change. In an effort to move beyond this constrained understanding of dissonance reduction, participants were presented with several reduction strategies simultaneously and variables that may affect the selection of a reduction strategy (e.g., attitude importance and negative affect) were examined. Ultimately this research should add a small but important contribution to the further formulation and refinement of the theory of cognitive dissonance.

Experiment 1

The first of two studies aimed to expand dissonance research conducted using the hypocrisy paradigm by 1) applying the paradigm to a new topic, 2) measuring participants' reported levels of dissonance both after the dissonance manipulation and after engaging in a dissonance reduction strategy, 3) offering participants a choice of one of several reduction strategies, and 4) examining how attitude importance is related to

dissonance magnitude and the choice of a reduction strategy. The study involved a 2 (hypocrisy manipulation: yes or no) x 2 (attitude importance: low or high) x 2 (time: pre and post strategy use) mixed factorial research design. A second within-subjects variable (i.e., the preference ratings of four different reduction modes) was also included. The hypocrisy paradigm was chosen to induce dissonance because the question of why people do not behave in ways congruent with their beliefs and attitudes forms the essence of the research. If people value the welfare of animals why do their consumption habits not mirror this concern? In the hypocrisy paradigm participants advocate a position they already believe, as compared with the induced compliance paradigm that takes the reverse approach by inducing participants to act counterattitudinally. To the point, the researcher was not interested in having participants act counterattitudinally and consequently devalue the welfare of animals. After recording a video statement advocating the consumption of cage-free eggs, participants were made mindful of their own past failures to follow this advice, or not. Dissonance was then assessed both before and after participants chose and completed a dissonance reduction mode.

Hypothesis 1: Dissonance and Attitude Importance

I expected an interaction between the hypocrisy manipulation and attitude importance. Within the hypocrisy condition participants' reported levels of dissonance were expected to increase in accordance with their level of attitude importance. That is, participants who reported in a pretest measure that the issue of egg-laying chickens' welfare is important to them were expected to experience more dissonance (as measured by the dissonance thermometer) than participants who did not feel the issue is personally important to them. Participants in the no hypocrisy condition, regardless of level of

attitude importance, were expected to report lower levels of dissonance compared to those in the hypocrisy condition.

Hypothesis 2: Magnitude of Dissonance Experienced and Choice of Dissonance

Reduction Strategy

The choice of a dissonance reduction strategy was expected to be related to the level of dissonance experienced. Specifically, participants experiencing little dissonance (as measured by the dissonance thermometer) should opt for the strategy requiring the least effort (i.e., distraction), while participants experiencing more dissonance should choose a strategy requiring more effort (i.e., behaviour change).

Hypothesis 3: Dissonance Reduction as a Function of Strategy Choice

Dissonance levels (as measured by the dissonance thermometer) were expected to decrease after participants completed a dissonance reduction strategy. Lastly, because dissonance researchers have not yet examined whether certain strategies are more effective at reducing dissonance than others, the effectiveness of different strategies was also explored but no a priori hypotheses were developed.

Method

Participants

Students from Carleton University's Psychology participant pool completed the study for bonus course credit. A total of 166 participants volunteered for the study. One participant recognized the dissonance thermometer and her data were removed from the study. Two participants did not read the adjectives for the dissonance thermometer (as indicated by responses of entirely 1s and 4s) and were excluded from the analysis. Only one participant reported eating absolutely no eggs or products made with eggs and as

such her data were not included in the analysis. In the hypocrisy condition, one participant indicated that all of the eggs she ate were from free-range chickens and her data were also excluded from the analysis. An additional 11 students came to complete the study but did not wish to be videotaped and as such were not included in the analyses. The final sample included 150 students, with 112 women (comprising 75% of the sample) and 38 men (comprising 25% of the sample) ($M = 20.14$ years, $SD = 5.17$).

Procedure

Prior to volunteering for the study, participants completed a pretest measure embedded in the psychology department's mass testing questionnaire package. This measure provided the researcher with information about participants' eating habits and the importance participants gave to the issue of poorly treated battery-caged chickens.

Using a procedure adapted from Fried and Aronson's (1995) hypocrisy method, participants completed the study individually in a room equipped with chairs, a table, and a video recorder. The experimenter introduced herself to participants as a research assistant hired by the Humane Society to develop programs to increase the awareness of their "Chicken Out Egg Program." Rather than participating in a traditional psychology experiment, participants were asked to volunteer in the creation of an educational and persuasive video designed to increase junior high school students' awareness of ethically produced food. Participants were told about the goals of the Chicken Out Egg Program (e.g., to increase consumer demand for free range and free run eggs) and the problems associated with conventional battery produced eggs (e.g., a summary of the inhumane conditions endured by battery cage chickens). The participant's time was spent writing a short speech and creating a video about the importance of buying cage-free eggs. To

ensure that the procedure aroused dissonance, participants were told that they were free to leave at anytime and that they did not need to participate in any aspect of the study they disagreed with (i.e., thereby creating a high choice condition), while still receiving their research credit. Participants who were willing to complete the video then signed an additional consent form noting that they freely chose to create a campaign video.

To aid participants in the development of their speech and video, the experimenter provided them with a list of facts about why it is important to purchase ethically produced eggs. Participants used these facts to compose their speech and video. Participants were told that the end of their videos must include the motto of Chicken Out: “Chickens deserve better. Always eat cage-free eggs.” After composing their speeches, the experimenter recorded participants delivering them. Participants were assured that they did a good job and that their video would be used in the project.

Upon completion of the video the hypocrisy manipulation was introduced. Half of the participants were told that in an effort to create useful promotional material the Chicken Out project coordinator wanted to know how often people ate cage-free eggs. Participants were asked to consider how often in the past two weeks they ate eggs or products containing eggs. They then had to calculate how many of those eggs definitely came from cage-free chickens (information provided to participants suggested that unless they sought out eggs labeled cage-free they should assume the eggs were from battery-caged chickens). This was the hypocrisy manipulation that was used to induce dissonance. Participants in the control condition completed an alternate filler task that kept their attention focused on cage-free eggs without implicating their own personal behaviour. Following Fried and Aronson’s (1995) procedure, control participants

completed a word puzzle with words related to cage-free eggs under the guise that the experimenter wanted to test the appropriateness of these puzzles for younger children. Participants were told that if university students could complete the puzzle in 5 minutes, then the puzzles would be deemed to be challenging enough, but not too difficult, for young students.

After the hypocrisy manipulation, both groups of participants were given a dissonance self-report measure. The researcher provided a cover story for this measure by explaining to participants that the ethics committee required completion of this questionnaire for some psychology studies.

Following this questionnaire, participants were presented with four options as a way to end their time in the laboratory (these options were the disguised dissonance reduction strategies and their order of presentation was randomized). The researcher said that the Chicken Out research coordinator was interested in learning which type of tasks student participants were interested in and asked that participants rate the favourability of each of four options, noting that participants would complete the option they rated as the most favorable. The experimenter was clear that all the options took less than five minutes to complete.

After completing the chosen dissonance reduction strategy, participants were asked to complete the dissonance self-report scale again under the guise of a required ethics mood questionnaire. A final package that included scales to assess potential moderating variables (i.e., self-esteem, preference for consistency, self-monitoring, and personality traits) was given to each participant (see Appendix B). One final question asked participants to rate their level of freedom in completing the study; this item was

included to rule out external justification on the part of participants. The researcher then inquired as to any suspicions participants had during the study and completed the debriefing procedure. Lastly, participants were asked not to share the purpose of the study with other students.

Measures

Dissonance. Elliot and Devine's (1994) self-report dissonance thermometer was given to participants following the hypocrisy manipulation and after the completion of a reduction mode to assess individuals' levels of dissonance. This measure instructs participants to indicate their current affective state by rating a series of adjectives on a scale ranging from 1 (*does not apply at all*) to 7 (*applies very much*). Four subscales (i.e., positive affect, negative self affect, shame, and discomfort) are formed by averaging the adjective ratings, with higher numbers on the three dissonance subscales indicating increased levels of dissonance. All four subscales demonstrated acceptable levels of internal consistency reliability (Nunnally, 1978), with the positive and negative affect scales exhibiting excellent internal consistency values (see Table 1).

Table 1

Internal Consistency Values for Dissonance Thermometer

	Positive Affect		Negative Self-Affect		Shame		Discomfort	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Cronbach's Alpha	.87	.91	.92	.94	.75	.77	.73	.72
Test-retest reliability	$r = .91$		$r = .90$		$r = .84$		$r = .73$	

Attitude importance. Prior to participants entering the lab, the researcher collected information on their attitudes toward the treatment of battery-caged chickens through a questionnaire that was included in the Psychology Department's annual mass testing procedure. The mass testing procedure is a large questionnaire package that contains a diverse set of measures from psychology labs at Carleton University. The attitude importance measure from this study was but one of twenty-four questionnaires included in the package. It included five items (see Appendix B), with statements such as "the treatment of egg-laying chickens is a topic worthy of discussion." Statements were rated on a scale from 1 to 7, with higher scores indicating greater attitude importance. The scale had good internal consistency ($\alpha = .89$). A median split of this variable (median = 4.40) divided participants into low and high attitude importance groups for the purpose of statistical analyses.

Reduction strategies. In the final phase of the experiment participants were presented with four different dissonance reduction strategies, the order of which was randomized. Before selecting a reduction mode to complete, participants rated how preferable each option was on a scale ranging from 1 (*least preferred*) to 7 (*most preferred*). Participants were then able to:

- 1) Read "why I can't always buy cage free eggs: information about the expense and barriers to buying cage free eggs" (add consonant cognitions that justify not consuming cage free eggs)
- 2) Read "it's not my fault I can't buy cage free eggs: information about farmers' responsibility to treat all chickens humanely" (deny responsibility for not consuming cage free eggs)

- 3) Write a Chicken Out campaign support letter (reduce dissonance through a behavioural route)
- 4) Read about a different program offered by the Humane Society “the benefits to seniors of visits from shelter animals” (distract their attention away from the dissonant experience)

Individual difference variables. At the conclusion of the study participants completed four questionnaires that measured individual differences variables of interest (i.e., self-esteem, cognitive consistency, self-monitoring, and personality traits). The measures for these items, and their internal consistency scores, can be found in Appendix B.

Variables as Procedural Checks

Number of eggs consumed. In the hypocrisy condition, participants estimated the number of whole eggs and products containing eggs that they consumed over the past two weeks. They also estimated how many of these eggs were produced from cage-free chickens by answering “Approximately how many of these eggs or egg products can you be confident were not produced by battery-caged chickens?” These items were used to screen out participants who did not eat eggs or who only ate cage-free eggs and were also included in preliminary analyses.

Perceived freedom. At the end of the study participants rated how much freedom they felt they had in completing the video and the study with a 7-point Likert scale ranging from 1 (*complete freedom*) to 7 (*no choice*). This measure is commonly used in dissonance studies as a means to measure, and ideally rule out, unwanted external justification caused by the procedure.

Dissonance thermometer. Although the dissonance thermometer provided a measure of the main dependent variable (i.e., magnitude of dissonance) it also acted as an important manipulation check to ensure that participants in the hypocrisy condition experienced more dissonance than those in the control condition.

Results: Experiment 1

Appropriate data screening procedures were conducted following the recommendations of Tabachnick and Fidell (2007) and are detailed in Appendix D. No major issues were uncovered during the data screening and appropriate steps were taken to address any data analysis assumption violations. For a correlation table illustrating relationships among independent and dependent variables and overall descriptive statistics also refer to Appendix D.

Experiment 1: Procedural Checks

Number of eggs consumed. To ensure that their past behaviour was in fact indicative of hypocrisy in light of the speech they just delivered, participants in the hypocrisy condition were asked to report on (a) their total egg consumption and (b) their total cage-free egg consumption over the past two weeks. Participants in the hypocrisy condition reported eating a considerable number of eggs and products containing eggs over the previous two weeks ($M = 20.46$, $SD = 15.76$). By comparison, they reported eating few free-run eggs ($M = 1.51$, $SD = 3.36$). The size of the discrepancy between eggs eaten and cage-free eggs eaten was taken as evidence that the conditions in this study were appropriate to elicit feelings of hypocrisy, and hence, dissonance. Egg consumption behaviours were uncorrelated with feelings of dissonance at time 1 (r s ranging from $-.12$ to $.13$) and as such were not included in subsequent analyses.

Perceived freedom. A necessary condition for eliciting cognitive dissonance is the perception of free will to engage in the behaviour in question. Hence, perceived freedom to compose and deliver the speech in support of cage-free eggs was assessed as a procedural check. The majority of participants (80.5%) felt completely free (indicated by a score of 1 or 2, on a 7-point scale) in their decision to participate ($M = 1.91$, $SD = 1.50$, $mode = 1$). Furthermore, perceived freedom was uncorrelated with feelings of dissonance at time 1 (r s ranging from $-.05$ to $.08$) and was therefore not included in subsequent analyses.

Experiment 1: Preliminary Analyses

A few preliminary analyses were conducted to (a) examine the integrity of the random assignment process, (b) screen for potential covariates appropriate in future analyses, and (c) ensure the manipulation affected levels of dissonance and not positive affect.

Gender. Only 25.3% of the sample was male. Analyses conducted with gender as a between-groups factor revealed no significant gender differences on key variables (e.g., dissonance levels, preference ratings of reduction modes) (p s $> .35$). Gender was not included in subsequent analyses.

Positive affect. To demonstrate that the design of the study only influenced feelings of dissonance, and not feelings of positive affect, a mixed model repeated measures ANOVA was conducted with positive affect at times 1 and 2 as the within factor and condition (control or hypocrisy) and attitude importance (low or high) as the between factors. Nonsignificant results for each of these factors and the corresponding interactions (p s $> .11$) indicated that positive affect did not change significantly over time

or as a function of attitude importance or condition. As such, positive affect was not included in subsequent analyses.

Checks for Initial Group Equivalence. A series of independent samples t-tests were conducted to check for significant differences between participants in the control and hypocrisy conditions. This was done to ensure the two groups were, in general, equivalent on non-manipulated variables (e.g., age, number of eggs eaten, individual difference variables, perceived freedom, and the mean score on attitude importance rather than simply the median). All but one of these tests indicated initial equivalence of the groups on the variables examined ($ps > .05$). In the sole exception, participants assigned to the hypocrisy condition scored significantly higher on a measure of openness ($M = 5.65$, $SD = 1.14$) than those in the control group ($M = 5.21$, $SD = 1.13$), $t(146) = -2.36$, $p = .02$. This result was not, however, significant at the familywise corrected alpha level of .005. Further, as openness was not correlated with any of the primary dependent variables of interest, and the overall pattern of results suggests initial equivalence, the groups were judged to be initially equivalent for the purposes of the main analyses.

Experiment 1 Main Analyses: Hypothesis Tests

Omnibus tests. A multivariate analysis of variance (MANOVA) assesses the influence of independent variables on multiple dependent variables (e.g., all of the dissonance subscales) simultaneously. This provides protection from Type I errors for the omnibus tests and in some instances can increase power (Tabachnick & Fidell, 2007, p.244). To assess the influence of condition (hypocrisy or control), attitude importance (high or low), and time (pre and post reduction strategies) on dissonance (as measured with the three negative affect subscales of the dissonance thermometer) a mixed model 2

x 2 x 2 MANOVA, with condition and attitude importance as between-subjects factors and time as a within-subjects factor, was conducted as the main, omnibus analysis.

Results from this analysis are summarized in Table 2.

Table 2

Significant Main and Interaction Effects from MANOVA

	Wilk's Lambda	<i>F</i>	Sig. Level	Effect size (partial η^2)	Observed Power
Time	.84	8.67	< .001	.16	.99
Condition	.93	3.28	.02	.07	.74
Attitude Importance	.94	3.03	.03	.06	.70
Condition x Importance	.92	3.77	.01	.08	.80

Note. No other interactions were significant.

Main effects were observed for all independent variables, and there was a significant interaction between condition and attitude importance. In other words, the multivariate analysis revealed that dissonance scores changed significantly over time, and that dissonance scores differed as a function of both hypocrisy condition and attitude importance. In particular, the multivariate results suggest that the nature of the relationship between hypocrisy condition and dissonance depends to some extent on whether attitudes are either high or low in importance.

Univariate *F* tests and pairwise comparisons were conducted to explore these findings further. Univariate *F*s were examined in lieu of Roy-Bargmann stepdown analysis because no theoretical basis existed for prioritizing the dependent variables. A familywise alpha level was set at .18 given the complexity of the design, which meant each individual test had an alpha level set at .01 (Tabachnick & Fidell, 2007, p. 271). The

section that follows reports the significant univariate findings, separately for each subscale of the dissonance measure.

Univariate Tests

Dissonance Subscale: Shame. A significant main effect of time revealed that, in general, participants felt more shame at time 1, before they were offered a dissonance-reduction strategy ($M_1 = 1.96, SD = 1.25$) than at time 2, after they completed a dissonance-reduction strategy ($M_2 = 1.71, SD = 1.09$), $F(1, 140) = 21.12, p < .001$, partial $\eta^2 = .13$. A significant main effect of attitude importance, $F(1, 140) = 6.25, p = .014$, partial $\eta^2 = .04$, revealed that participants low in attitude importance experienced less shame overall ($M = 1.65, SD = .89$) than participants high in attitude importance ($M = 2.11, SD = 1.42$). A marginally significant main effect of condition $F(1, 140) = 3.72, p = .056$, partial $\eta^2 = .03$, further revealed that participants in the hypocrisy condition reported feeling more shameful overall ($M = 2.01, SD = 1.26$) than did participants in the control condition ($M = 1.70, SD = 1.07$). The interaction between hypocrisy condition and attitude importance was not significant for this subscale ($p = .24$), nor were any interactions with time.

Dissonance Subscale: Self-Directed Negative Affect. Examination of the significant main effect of time, $F(1, 140) = 6.45, p = .012$, partial $\eta^2 = .04$, indicated that participants' feelings of self-directed negative affect ($M_1 = 1.65, SD = .99$) decreased after a dissonance reduction strategy was employed ($M_2 = 1.56, SD = .96$). Table 3 presents the results from the main effects and interaction effect.

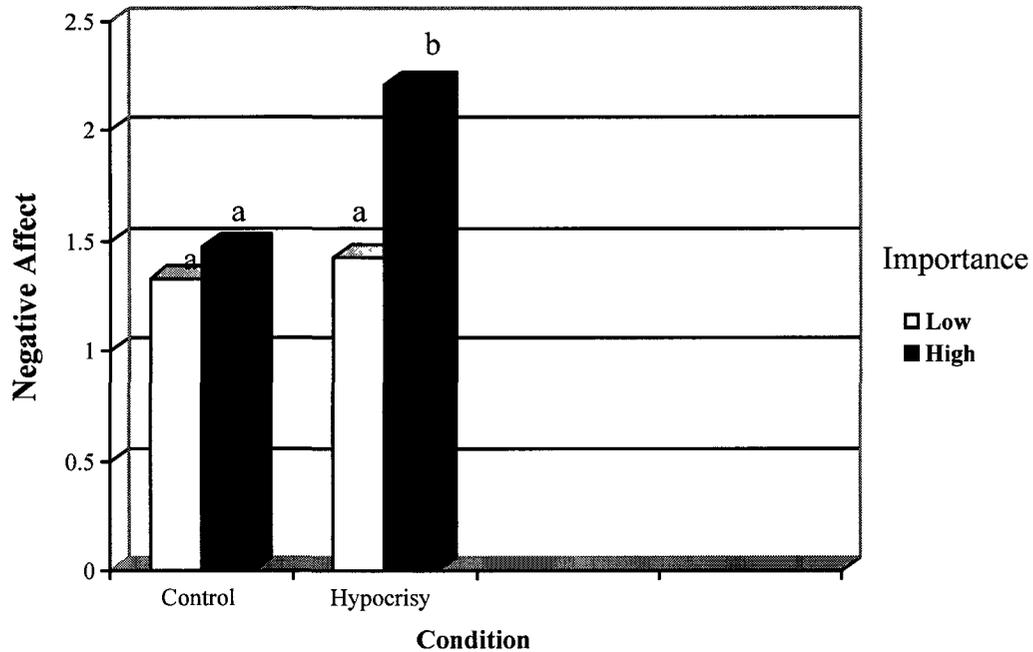
Table 3

Significant Effects for Self-Directed Negative Affect

	<i>F</i>	Sig. Level	Effect size (partial η^2)	Observed Power
Time	6.45	.012	.04	.99
Condition	7.37	.007	.05	.77
Attitude Importance	9.09	.003	.06	.85
Condition X Importance	4.51	.036	.03	.56

Moreover, participants in the hypocrisy condition reported significantly more self-directed negative affect ($M = 1.82$, $SD = 1.11$) than participants in the control condition ($M = 1.40$, $SD = .81$), $F(1, 140) = 7.37$, $p = .001$, $\eta^2 = .05$. And as expected, participants low in attitude importance reported significantly less self-directed negative affect ($M = 1.38$, $SD = .62$) than participants high in attitude importance ($M = 1.84$, $SD = 1.26$), $F(1, 140) = 9.09$, $p = .003$, $\eta^2 = .06$. Finally, these results were qualified by a marginally significant interaction between hypocrisy condition and attitude importance, $F(1, 140) = 4.51$, $p = .036$, $\eta^2 = .03$ (see Figure 1).

Figure 1. Interaction Between Condition and Importance for Negative Affect.



Note. Bars with different subscripts differ significantly at $p < .003$.

As shown in Figure 1, whereas those in the control condition reported similarly low levels of self-directed negative affect, regardless of attitude importance, attitude importance seemed to make a critical difference in the hypocrisy condition. Participants confronted with their own hypocrisy who did not feel strongly about the ethical treatment of animals felt as much negative affect as those in the control condition. Indeed, it was the participants who felt most strongly about animal rights, and who also faced hypocrisy about the issue who reported the highest levels of self-directed negative affect. High attitude importance participants in the hypocrisy condition experienced significantly more self-directed negative affect when compared to all other groups.

Dissonance Subscale: Discomfort. A main effect of time was observed for discomfort, $F(1, 140) = 13.31, p < .001$, partial $\eta^2 = .09$. Specifically, participants'

feelings of discomfort ($M1 = 2.29, SD = 1.26$) decreased after a dissonance reduction strategy was employed ($M2 = 2.03, SD = 1.13$). Table 4 presents the results from the main effects and interaction effect.

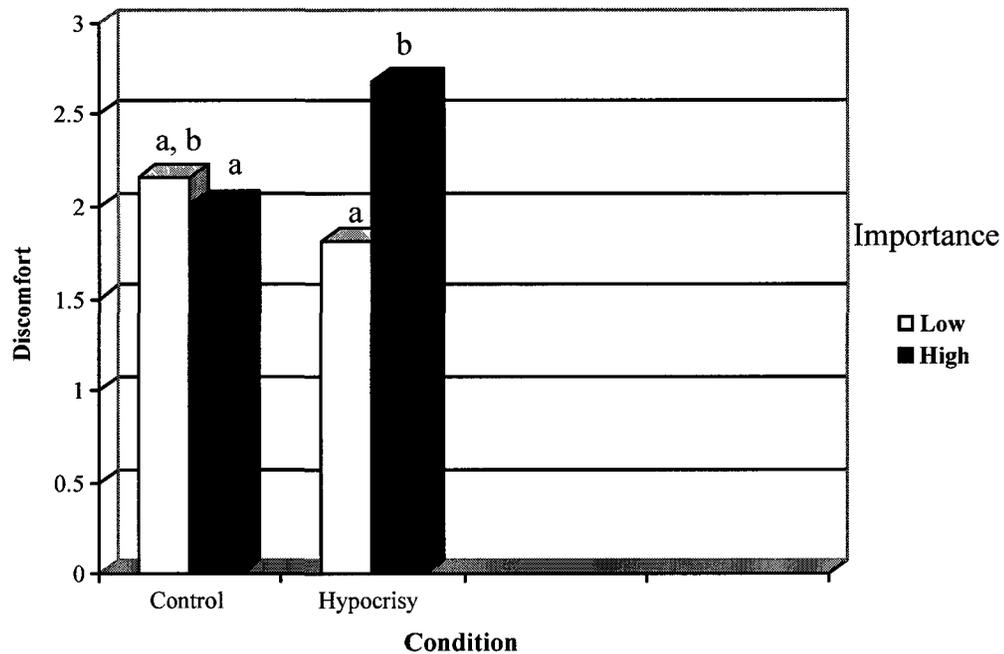
Table 4

Significant Effects for Discomfort

	<i>F</i>	Sig. Level	Effect size (partial η^2)	Obs. Power
Time	13.31	.001	.09	.99
Condition	.76	.39	.005	.14
Att. Impt.	3.86	.052	.03	.50
Cond x Impt.	7.34	.008	.05	.77

No significant differences were observed in the reported discomfort of participants in the hypocrisy and control conditions, $F(1, 140) = .76, p = .39, \eta^2 = .005$. A marginally significant effect of attitude importance was observed, however, with participants low in attitude importance reporting less discomfort ($M = 1.98, SD = 1.04$) than participants high in attitude importance ($M = 2.34, SD = 1.34$), $F(1, 140) = 3.86, p = .052, \eta^2 = .03$. Importantly, these results were qualified by a significant two-way interaction between hypocrisy condition and importance (see Figure 2).

Figure 2. Interaction Between Condition and Importance for Discomfort.



Note. Bars with different subscripts differ significantly at $p < .003$.

Whereas discomfort levels in the control condition did not differ significantly as a function of attitude importance, high attitude importance participants reported the highest levels of discomfort when they were also reminded of their own hypocrisy.

Analyses for Dissonance Reduction Options

Preferences among dissonance reduction options. To determine whether participants demonstrated preferences in terms of the reduction strategies chosen, a chi-square goodness of fit test was calculated to assess whether the four reduction options were equally selected by participants². A significant goodness of fit test, $\chi^2 (3, N = 143) =$

² This analysis was collapsed across condition because chi-square tests of independence revealed that the frequencies of the chosen reduction strategies did not differ between conditions ($ps > .07$). In terms of attitude importance, only the frequency of choosing the letter option varied between high and low

36.27, $p < .001$, indicated that the chosen reduction strategies were not equally selected (see Table 5). Participants demonstrated a clear preference for externally justifying their behaviour by reading about the expensiveness of cage-free eggs. Very few participants preferred to engage in the more effortful behavioural reduction strategy.

Table 5

Frequency of Chosen Reduction Strategies

Type of Option Chosen	%	Expected %	Observed N	Expected N
External justification (Expense)	43	25	62	35.8
Deny responsibility (Blame Farmers)	28	25	39	35.8
Distraction (Senior Program)	21	25	30	35.8
Behaviour (Letter Writing)	8	25	12	35.8

To further examine preferences among the reduction strategies, a repeated measures ANOVA was conducted, with ratings for each strategy (external justification, denial of responsibility, distraction, behaviour) as the within factor. Participants did exhibit preferences among the reduction options, $F(3, 141) = 41.89$, $p < .001$, partial $\eta^2 = .23$. As shown in Table 6 follow-up pairwise comparisons (corrected for a familywise alpha = .05) indicated that the ratings for each option were significantly different from one another, with the overall preference ratings for the options corresponding to the pattern depicted above in terms of chosen reduction options. That is, the ratings for the strategies from highest to lowest were external justification, denial of responsibility, distraction, and then the behaviour option.

importance participants. That is, more high attitude importance participants chose the letter ($n = 9$) than did low attitude importance participants ($n = 3$) ($p = .03$).

Table 6

Pairwise Comparisons of Preference Ratings

	Mean	Standard Error
External justification (expense)	5.35*	.13
Deny responsibility (blame farmers)	4.84*	.14
Distraction (senior program)	4.06*	.15
Behaviour (write letter)	3.23*	.15

Note. All pairwise comparisons significant at $p < .002$

To determine if these preference ratings varied by condition and or attitude importance separate ANOVAs were conducted on the ratings for each reduction option. The significance level was maintained at .05 across the four separate ANOVAs with a Bonferroni correction. For the preference ratings of the external justification, denial of responsibility, and distraction options neither condition nor attitude importance significantly influenced the ratings (ps ranging from .07 to .92). Importantly, for the preference rating for the behaviour option (i.e., letter writing) there was a significant main effect of attitude importance, $F(1, 137) = 9.96, p = .002, \text{partial } \eta^2 = .07$. Participants high in attitude importance rated the behaviour strategy as more preferable ($M = 3.74, SD = 1.95$) than participants low in attitude importance ($M = 2.83, SD = 1.45$), $p = .002$.

Dissonance magnitude and preference of reduction option. Beyond examining whether the independent variables influenced participants' choices of dissonance reduction strategies, it was also desirable to assess whether the level of dissonance experienced by participants was related to the selection of a reduction option. Perhaps participants experiencing high levels of dissonance would be more likely to rate the letter writing option as more preferable to the other options. To determine if the level of

dissonance participants experienced was related to their ratings of the reduction options a mixed model ANOVA was conducted with dissonance magnitude (low or high from median split) as a between factor and rating of type of option (justification, denial, distraction, and behavioural planning) as a within factor. It was hypothesized that participants experiencing greater levels of dissonance may be more motivated to resolve their dissonance by participating in the letter writing campaign rather than justify their behaviour or focus their attention on something else. However, after dividing participants into high and low dissonance magnitude groups based on an average of all the dissonance subscales at time 1 this was not the case. Dissonance magnitude did not affect participants' ratings of the reduction options, $F(1, 137) = .08, p = .77$.

Dissonance as it relates to choosing the behavioural strategy. It was hypothesized that as dissonance increases one may be more likely to choose the more effortful behavioural reduction strategy rather than other reduction options. Although the preference ratings of the options did not vary by dissonance level it is possible that the options participants actually chose varied according to the amount of dissonance they were experiencing. To determine if level of dissonance was significantly related to the choice of the behavioural reduction mode, a logistic regression analysis was conducted with choice of reduction strategy as the binary dependent variable (coded as behavioural mode or other). To build the model, the three dissonance subscales (i.e., shame, discomfort, and self-directed negative affect) were simultaneously entered to predict choice of the behavioural strategy (with *letter writing not chosen* as the reference category). The forced entry method was chosen for the regression analysis because no theoretical backing warranted an earlier inclusion of one variable over another, as in

hierarchical regression. Also, a stepwise method was not chosen due to concerns about the influence from random variation in the data on the final outcome of the model (Field, 2009, p.212).

A logistic regression model indicated the variables together significantly predicted choosing the letter writing option, model $\chi^2(df=3) = 10.77, p = .01$. However, only shame made a significant unique contribution to the prediction. Both self-directed negative affect and discomfort were nonsignificant predictors (see Table 7). Higher feelings of shame were associated with a greater likelihood of writing the letter, adjusted odds ratio (OR_{adj}) = 3.80, 95% CI [1.50, 9.66], Wald $\chi^2(df=1) = 7.88, p = .005$.³ Together, the model explained up to 16% of the variance in choosing to write the letter (Nagelkerke $R^2 = 0.16$; Cox & Snell $R^2 = 0.07$).

Table 7

Predicting the Choice of the Letter Writing Option

	B (SE)	Adjusted Odds Ratio	95% CI	Sig.
Included				
Shame	1.34 (.48)	3.80	[1.50, 9.66]	.005
Negative Aff.	-.77 (.53)	.46	[.16, 1.31]	.146
Discomfort	-.58 (.40)	.56	[.25, 1.24]	.154

Note. CI = confidence interval; SE = standard error.

Dissonance reduction based on chosen strategy.⁴ An exploratory analysis was conducted to evaluate whether particular dissonance reduction strategies were more

³ To ensure shame was accounting for unique variance associated with the outcome a second logistic regression analysis was conducted with condition and attitude importance entered in step 1 of the model and all three dissonance subscales entered in step 2. While controlling for the effects of the two independent variables, shame was still a significant predictor of the outcome ($p = .005$).

⁴ Reasoning for this analysis and statistical assumptions underlying it are provided in Appendix D.

effective than others at reducing overall dissonance for participants. Although participants were not randomly assigned to a dissonance reduction strategy, it was possible to control for their overall levels of dissonance at time 1 by using a composite variable including all dissonance subscales as a covariate. An ANCOVA with type of option used (external justification, denial of responsibility, or distraction) and dissonance at time 1 as a covariate was conducted to determine if post-strategy dissonance (i.e., overall dissonance at time 2) varied as a function of the strategy used. The letter writing option was excluded from the analysis because so few participants chose it that it would create largely unequal cell sizes for the ANCOVA.

Dissonance at time 1 was an appropriate covariate, as indicated by a significant effect of this variable on dissonance at time 2, $F(1, 127) = 387.90, p < .001$, partial $\eta^2 = .74$. And importantly, the strategy chosen had a significant effect on self-reported dissonance at time 2, $F(1, 127) = 4.65, p = .011$, partial $\eta^2 = .07$. Follow-up pairwise comparisons showed that the only significant differences occurred between the choice of the distraction option compared with denial of responsibility and external justification which did not differ from each other. Participants who chose distraction as their reduction strategy experienced significantly less dissonance at time 2 ($M = .14, SD = .15$) compared to those who chose external justification ($M = .20, SD = .19$) or denial of responsibility ($M = .20, SD = .20$) (ps of .008 and .006, respectively).

Discussion: Experiment 1

One of the primary goals of Experiment 1 was to assess the effect of attitude importance on reported levels of dissonance. By including this variable in the design, I was able to determine that the effectiveness of the hypocrisy manipulation (as measured

by the dissonance thermometer) was moderated by levels of attitude importance.

Participants reported higher levels of dissonance if they previously indicated that the welfare of battery-caged chickens is a topic of high personal importance to them. And importantly, this effect was qualified by a significant interaction between attitude importance and hypocrisy condition. For both the *discomfort* and *self-directed negative affect* subscales, participants high in attitude importance who were also reminded of their hypocrisy reported higher ratings on these subscales than participants in all other conditions. Clearly, attitude importance is relevant to the arousal of dissonance, particularly when paired with a hypocrisy manipulation.

Perhaps even more interesting is that despite being confronted with their own hypocrisy about cage-free eggs, participants low in attitude importance expressed levels of dissonance essentially equivalent to their peers in the control condition. That is to say, the hypocrisy manipulation was ineffective as a means of dissonance induction when participants did not care about the topic at hand. This finding gives weight to Festinger's (1957) original formulation of dissonance magnitude. He believed dissonance magnitude was the result of a ratio between the sum of one's discrepant cognitions divided by the sum of one's consonant cognitions while considering the importance of the cognitions. Although dissonance researchers have not examined the role of attitude importance in the arousal of dissonance extensively (see Eisenstadt & Leippe, 2005; Starzyk et al., 2009 for exceptions), findings from this study would suggest that such an examination is worthwhile. Accounting for attitude importance in the design of dissonance studies can ensure researchers select topics that participants will find important and hence create situations capable of arousing dissonance. Furthermore, randomly assigning participants

to condition based on attitude importance, as in this study, will allow for analyses that can explore the effects of importance while ensuring that importance levels are equally distributed across conditions. Ultimately, accounting for importance may lead to fewer failed dissonance studies while strengthening our understanding of this factor's role in dissonance theory.

A second goal of Experiment 1 was to explore participants' preferences for different types of dissonance reduction strategies and to consider possible predictors of such preferences. As previously mentioned, cognitive dissonance researchers have used attitude change as the primary measure of dissonance reduction, thereby narrowing our understanding of dissonance reduction. In many situations that elicit dissonance, multiple reduction modes will be available to people. The inclusion of four different reduction modes in the present experiment allowed for an exploration of any preferences that might exist among different modes.

A clear pattern of preferences was observed in Experiment 1. Participants' preference ratings for the reduction options indicated that externally justifying their past consumption of battery-caged eggs by reading about the expense of such eggs was the most favoured option. Denying responsibility for one's past behaviour by shifting the blame to farmers was the second most preferred option followed by ignoring the issue altogether and instead reading about a Humane Society senior citizens program. The least preferable reduction mode was the one that required more effort than the other three options. Participants decided that writing a letter in support of cage-free egg practices was the least desirable alternative. Confidence in these preference ratings as good indicators of how participants really felt about each of the options is strengthened by the

results of the chi-square goodness of fit test. Indeed, the reduction modes actually chosen by participants followed the same pattern as the ratings, with external justification on top and behaviour at the bottom. Only 8% of participants wrote a letter in support of the cage-free egg campaign. Importantly, further analyses revealed that choosing the letter writing option was related to high *attitude importance*. Two separate analyses (i.e., a chi-square test of independence and a repeated-measures ANOVA) indicated that higher levels of attitude importance were associated with higher preference ratings of the letter and an increased likelihood of choosing the letter. Perhaps caring considerably about the cage-free egg issue provided these participants with additional motivation to complete the more effortful behaviour option. By comparison, participants lower in attitude importance were satisfied to reduce their dissonance by less effortful, and less direct means.

Beyond attitude importance, *shame* was also a significant predictor of choosing the letter-writing option. Only an increased feeling of *shame* was associated with an increased likelihood of choosing this behaviour (both the *negative affect* and *discomfort* measures had negative and nonsignificant relationships with the behaviour mode). Stone and Fernandez (2008) have argued that the hypocrisy manipulation is particularly well suited to motivating behaviour change rather than encouraging other forms of dissonance reduction. Results from this experiment open the possibility that such a relationship may be due in part to feelings of shame.

The other main goal of Experiment 1 was to track participants' feelings of dissonance both after the hypocrisy manipulation and after the use of a dissonance reduction mode. Attitude change, like other dissonance reduction modes, is assumed to help people lessen the feelings of psychological discomfort that come from the presence

of opposing cognitions. However, few studies have directly measured dissonance levels post reduction strategy use (for exceptions see Elkin & Leippe, 1986; Elliot & Devine, 1994). A main effect of time on all three dissonance subscales indicated that participants felt less dissonance after engaging in a reduction mode. These findings mimic the results of Elliot and Devine (1994), suggesting that cognitive dissonance acts as a motivational drive, one in which people seek ways to minimize cognitive inconsistencies to alleviate feelings of psychological discomfort.

In terms of the effectiveness of different reduction strategies in actually alleviating dissonance, it seems that distraction was a particularly potent cure for dissonance. Participants who chose the distraction option reported significantly less dissonance post strategy use than participants who chose the other available options. Although research suggests people prefer direct methods of dissonance reduction over indirect methods (see Stone et al., 1997 and the preference ratings mentioned previously), indirect reduction methods such as distraction may actually reduce dissonance more than some direct methods (as evidenced in these results and as theorized by Hardyck & Kardush, 1968). Continuing to explore the effectiveness of different dissonance reduction modes will be important in future research if we hope to obtain a better understanding of the process of dissonance reduction.

Lastly, a number of potentially important moderating variables were measured in Experiment 1 to determine any significant relationships with participants' experiences of dissonance. Of note was the lack of a relationship found between dissonance and one's preference for *cognitive consistency* (Cialdini et al., 1995). All of the correlations between preference for cognitive consistency and the dissonance subscales were very

small in size (r s ranged from $-.01$ to $.02$), and none were statistically significant. The initial work surrounding this scale (Cialdini et al., 1995) was undertaken with a counterattitudinal task and the dependent variable in the experiment was attitude change. Perhaps the nonsignificant findings with this construct from Experiment 1 are due to a different dissonance manipulation (i.e., hypocrisy) and or the use of a direct measure of dissonance rather than the indirect measure of attitude change.

Although preference for cognitive consistency displayed no relationship to dissonance, *self-esteem* was significantly negatively correlated with dissonance (r s ranged from $-.21$ to $-.16$). In general, participants with higher levels of self-esteem also tended to report lower levels of dissonance. Indeed, high self-esteem may have served as a buffer to one's experience of cognitive dissonance. Work by Steele, Spencer, and Lynch (1993) has demonstrated that self-esteem can moderate the dissonance effects produced by the free-choice paradigm. Further work (Holland, Meertens, & Van Vugt, 2002) has indicated that people with high self-esteem experience less psychological discomfort and are therefore less likely to partake in dissonance reducing justification strategies. Results from Experiment 1 are in line with these previous findings.

Overall the results from Experiment 1 are promising. The hypocrisy manipulation was successfully used in a new context (i.e., ethical food choices); the role of attitude importance in cognitive dissonance was assessed with the use of the dissonance thermometer, and the process of dissonance reduction was examined by measuring dissonance after the use of one of several simultaneously available reduction modes. With these findings in mind, alterations were made for Experiment 2. Specifically, the dissonance levels reported in Experiment 1 were on the low end of the thermometer

rating scale (means ranging from 2.10 to 2.67) and higher levels of dissonance were desired in Experiment 2. Additionally, since so few participants (8%) chose the behavioural reduction option it was not included in the ANCOVA analysis and its effectiveness at reducing dissonance compared to the other options was not assessed. As such, changes made in Experiment 2 were intended to increase participants' levels of dissonance and their preference for writing in support of cage-free eggs practices. Lastly, because the hypocrisy manipulation was successful at inducing dissonance in Experiment 1, and has been used with success in many other studies, the no-hypocrisy control condition was removed from Experiment 2 to allow for a more concentrated focus on dissonance arousal and reduction. The specifics regarding these procedural changes are outlined in the following overview of Experiment 2.

Experiment 2

Three main changes were made to the design and procedure of Experiment 2. No control condition was included in this experiment. Given the success of the hypocrisy manipulation in Experiment 1, and its history of effectiveness (Fried & Aronson, 1995; Stone et al., 1994, 1997), combined with the desire to observe participants actually experiencing dissonance, a pure control condition was deemed unnecessary and uninteresting. Accordingly, Experiment 2 included a standard hypocrisy condition (*standard hypocrisy*) and a hypocrisy condition with additional video material (*hypocrisy plus*). In an effort to increase dissonance magnitude and to explore the effectiveness of education campaigns that make use of shocking video content to arouse emotional responses from an audience, the hypocrisy plus condition included a short video about battery-caged chickens.

Lastly, the dissonance reduction options offered to participants were changed slightly in Experiment 2. The behavioural option (i.e., writing in support of consuming cage-free eggs) was rarely chosen in Experiment 1, but it was unclear why this was the case. In Experiment 2, an attempt was made to ‘unconfound’ the reduction strategy chosen and the amount of effort required to execute the strategy. By making each strategy a writing task, the amount of effort required to complete the strategies was equalized. It was hoped that this modification would result in a purer test of both strategy choice and the effect of strategy choice on dissonance reduction.

Method

Participants

Students from Carleton University’s Psychology participant pool completed the study for bonus course credit. A total of 108 students came to the lab to participate in the study. Of this group, 9 participants refused to complete the video and as such were not taken through the study. One participant did not eat eggs and was also excluded from the study. The final sample size was 98 participants. Seventy-six women (78%) and 22 men (22%) completed the study and only demographic information concerning their age was collected ($M = 20.86$ years, $SD = 6.93$).

Procedure

The procedure for Study 2 remained identical to Study 1 except for the changes outlined below. The dissonance reduction options offered to participants in Study 2 all required writing. After choosing a reduction strategy, participants were given a piece of paper with the name of their option choice written at the top and space (i.e., seven blank lines) underneath for them to write their thoughts on the topic.

Two of the reduction options were presented differently in Study 2 compared to Study 1. The distraction option was altered from originally being about a Humane Society senior visiting program to writing about “what it is like to complete psychology studies”. This change was necessary as the distraction item no longer involved reading on the part of participants, and it was not possible to ask them to write about a fictional Humane Society senior program. The behavioural option was also changed slightly in Study 2 to allow for similarity across options. Writing about what participants could do to support cage-free egg practices was no longer depicted as a campaign letter, as it was in Study 1. Rather in Study 2 it was simply presented as an option similar to the other reduction strategy choices and read “write about what you can do to support cage-free egg practices.”

The control condition from Study 1 was not included in Study 2. Instead participants were randomly assigned to the experimental (i.e., standard hypocrisy) condition or the hypocrisy plus video condition (hypocrisy plus). The hypocrisy plus condition was identical to the original hypocrisy condition except that before writing their speeches, participants watched a two-minute video that depicted the living conditions of battery-caged chickens on a farm. The video was played on a laptop computer placed in front of participants. Participants were warned that they may find the video disturbing and they were free to stop watching the video at any time. All participants watched the entire video.

Lastly, one additional adjective was included in the list of items among the dissonance thermometer. Guilt was added to this scale and was included in the calculation of the *shame* subscale, which originally only included the adjectives of shame

and embarrassment. This item was added because it had been included in the development of the dissonance thermometer (Elliot & Devine, 1994) though not in all versions. Furthermore, researchers (Devine et al., 1999) have speculated about the specific emotions involved in different experiences of dissonance with some interested in the effects of guilt (Aronson, 1992).

Measures

Dissonance. Elliot and Devine's (1994) self-report dissonance thermometer was given to participants following the hypocrisy manipulation and after the completion of a reduction mode to assess individuals' levels of dissonance. This measure instructs participants to indicate their current affective state by rating a series of adjectives on a scale from 1 (*does not apply at all*) to 7 (*applies very much*). Four subscales (i.e., positive affect, negative self, shame, and discomfort) are formed by averaging the adjective ratings, with higher numbers on the three negative affect subscales indicating increased levels of dissonance. All four subscales demonstrated good internal consistency and test-retest reliability (see Table 8).

Table 8

Internal Consistency Scores for Dissonance Thermometer

	Positive Affect		Negative Self-Affect		Shame		Discomfort	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Cronbach's Alpha	.91	.92	.88	.91	.79	.85	.78	.81
Test-retest reliability	$r = .88$		$r = .91$		$r = .87$		$r = .78$	

Attitude importance. Prior to participants entering the lab, the researcher collected information on their attitudes toward the treatment of battery-caged chickens through a questionnaire that was included in the Psychology Department's annual mass testing procedure. The mass testing procedure is a large questionnaire package that contains a diverse set of measures from psychology labs at Carleton University. The attitude importance measure from this study was one of twenty-four questionnaires included in the package. It included five items (see Appendix B), with statements such as "the treatment of egg-laying chickens is a topic worthy of discussion". Statements were rated on a scale from 1 to 7, with higher scores indicating greater attitude importance. The scale had good internal consistency ($\alpha = .89$). A median split of this variable ($Md = 4.40$) divided participants into low and high attitude importance groups for the purposes of statistical analyses.

Dissonance-reduction strategies. In the final phase of the experiment participants were presented with four different dissonance reduction strategies. Before selecting a reduction mode to complete, participants rated how preferable each option was on a scale from 1 (*least preferred*) to 7 (*most preferred*). Participants were then able to:

- 1) Write about "why you may not be able to buy cage-free eggs due to things such as expense, availability, and convenience" (add consonant cognitions that justify not consuming cage free eggs)
- 2) Write about "why it's not your fault you can't buy cage free eggs because farmers have a responsibility to treat all chickens humanely" (deny responsibility for not consuming cage free eggs)

- 3) Write about “what you can do to support cage-free egg practices” (reduce dissonance directly through confronting the issue)
- 4) Write about “what it’s like to complete psychology studies” (distract their attention away from the dissonant experience)

Individual difference variables. At the conclusion of the study participants completed four questionnaires that measured individual difference variables of interest (i.e., self-esteem, cognitive consistency, self-monitoring, and personality traits). The measures for these items, along with internal consistency scores, can be found in Appendix B.

Variables as Procedural Checks

Number of eggs consumed. In both hypocrisy conditions, participants estimated the number of whole eggs and products containing eggs that they consumed over the past two weeks. They also estimated how many of these eggs were produced from cage-free chickens by answering “Approximately how many of these eggs or egg products can you be confident were not produced by battery-caged chickens?” These items served as part of the hypocrisy manipulation while also acting as a check for eliminating participants from the study who reported not eating any eggs.

Perceived freedom. At the end of the study participants rated how much freedom they felt they had in completing the video and the study with a 7-point Likert scale ranging from 1 (*complete freedom*) to 7 (*no choice*). This measure is commonly used in dissonance studies as a means to measure, and ideally rule out, unwanted external justification caused by the procedure.

Dissonance thermometer. Although the dissonance thermometer provided a measure of the main dependent variable (i.e., magnitude of dissonance) it also acted as an important manipulation check to ensure that participants in the hypocrisy plus condition experienced more dissonance than those in the standard hypocrisy condition.

Results: Experiment 2

As in Study 1, data screening procedures were conducted following the recommendations of Tabachnick & Fidell (2007) and are detailed in Appendix E. No major problems were found during data screening and any violations of assumptions were dealt with before conducting an analysis. For a correlation table illustrating relationships among independent and dependent variables and overall descriptive statistics also refer to Appendix E.

Procedural Checks

Number of eggs consumed. Across both hypocrisy conditions, participants reported eating a considerable number of eggs and products containing eggs over the previous two weeks ($M = 12.53$, $SD = 12.04$). By comparison, they reported that few of these eggs or egg products were from non-battery caged chickens ($M = 2.39$, $SD = 5.33$) thus creating the appropriate hypocritical situation. Egg consumption behaviour was not significantly correlated with any of the primary variables of interest except for feelings of discomfort at times 1 and 2 ($r_s = -.22$ and $-.20$, respectively). Interestingly, participants who reported eating more eggs tended to report lower levels of discomfort in this study. Given that this item was only correlated with one of the dissonance subscales it was not controlled for in the main analyses.

Proportion of consumed cage-free eggs to conventional eggs. A final analysis was conducted on these items to determine if the proportion of self-reported consumed cage-free eggs to conventional eggs differed across conditions or by attitude importance. A 2 (condition: hypocrisy or hypocrisy plus) by 2 (attitude importance: low or high) ANOVA with the proportion of cage-free to conventional eggs consumed as the dependent variable was conducted. A significant main effect was found for condition, $F(1, 89) = 6.10, p = .016, \eta^2 = .06$. Participants in the standard hypocrisy condition reported eating a significantly higher proportion of cage-free eggs ($M = .23$) than participants in the hypocrisy plus condition ($M = .08$). This main effect was qualified by a marginally significant interaction between condition and attitude importance, $F(1, 89) = 3.32, p = .07, \eta^2 = .04$. Follow-up comparisons (see Table 9) indicated that the only significant cell difference was between high attitude importance participants in the standard hypocrisy ($M = .27$) and hypocrisy plus ($M = .02$) conditions ($p = .003$). That is, among participants high in attitude importance, those in the hypocrisy condition reported eating a significantly higher proportion of cage-free eggs than hypocrisy plus participants. For those low in attitude importance, on the other hand, cage-free egg consumption did not differ significantly as a function of hypocrisy condition.

Table 9

Differences in the Proportion of Cage-Free Eggs Consumed

Attitude Importance	Hypocrisy	Hypocrisy Plus
Low	.18 ^{a,b}	.14 ^{a,b}
High	.27 ^a	.02 ^b

Note. Different subscripts indicate significance at $p < .005$.

Perceived freedom. It is unlikely that participants felt forced to complete the study, therefore ruling out external justification of their behaviour based on this reason. With a modal response of 1, representing complete freedom to participate, the majority of participants (70%) selected 1 or 2 indicating they were completely free to participate in the study ($M = 2.20$, $SD = 1.62$). Furthermore, perceived freedom was uncorrelated with feelings of dissonance at time 1 (r s ranging from .01 to .18) and as such was not taken into account in further analyses.

Experiment 2: Preliminary Analyses

A few preliminary analyses were conducted to (a) examine the integrity of the random assignment process, (b) screen for potential covariates appropriate in future analyses, and (c) ensure the manipulation affected levels of dissonance and not positive affect.

Gender. Only 22.4% of the sample was male, and the gender distribution for each cell of the MANOVA can be seen in Table 10.

Table 10

Gender Distribution Among MANOVA Cells

Gender	Standard Hypocrisy		Hypocrisy Plus	
	High Importance	Low Importance	High Importance	Low Importance
Male	7 (27%)	9 (35%)	1 (5%)	5 (21%)
Female	19 (73%)	17 (65%)	21 (95%)	19 (79%)
Totals	26	26	22	24

A series of independent samples t tests with gender as the grouping variable indicated significant gender differences (p s < .02) on key variables (i.e., all of the dissonance subscales at times 1 and 2). Females scored significantly higher on all of the dissonance

subscales compared to males. The issue of battery-caged chickens was also more important to females ($M = 4.71$, $SD = 1.43$) than to males ($M = 3.99$, $SD = 1.40$), $t(96) = 2.10$, $p = .04$. As there were considerably fewer males than females in the study, gender was not used as a grouping variable in the MANOVA because it would create highly unequal cell sizes, in particular with one cell containing only a single case. Gender was considered as a covariate for the MANOVA but an ANOVA revealed that gender was not independent from the experimental condition, $F(1, 94) = 4.71$, $p = .03$, and therefore violating a main assumption of a covariate analysis. Although gender could not be accounted for in the MANOVA, the results from the analysis were computed with the full sample size and then again with only females in the sample to determine if gender was having a pronounced effect on the results. No significant changes occurred when testing the complete sample versus the female-only sample. As such the complete sample was maintained for the analysis.

Positive affect. To determine if the design of the study only influenced feelings of dissonance, and not feelings of positive affect, a mixed model repeated measures ANOVA was conducted with positive affect at times 1 and 2 as the within factor and condition (hypocrisy or hypocrisy plus) and attitude importance (low or high) as the between factors. A significant main effect for condition, $F(1, 94) = 12.72$, $p = .001$, partial $\eta^2 = .12$, indicated that positive affect significantly varied between the hypocrisy and hypocrisy plus conditions. Specifically, participants in the hypocrisy condition reported higher levels of positive affect ($M = 4.79$, $SD = 1.31$) than participants in the hypocrisy plus condition ($M = 3.80$, $SD = 1.50$).

Checks for Initial Group Equivalence. A series of independent samples *t*-tests was conducted to check for significant differences between participants in the hypocrisy and hypocrisy plus conditions. This was done to ensure the two groups were equivalent on non-manipulated variables (e.g., age, number of eggs eaten, individual difference variables, perceived freedom, and the mean score on attitude importance rather than simply the median). Each of these tests indicated the groups did not differ significantly on these variables ($ps > .05$).

Main Analyses: Hypothesis Tests

Omnibus tests. A multivariate analysis of variance (MANOVA) assesses the influence of the independent variables on all of the subscales of the dependent variable simultaneously (e.g., self-directed negative affect, shame, and discomfort) and as such offers greater protection against Type I error because the total number of separate statistical tests is reduced. The influence of hypocrisy condition and attitude importance on changes in reported dissonance experienced before and after using a dissonance-reduction strategy was examined using a MANOVA model. Specifically, a mixed 2 (condition: standard hypocrisy or hypocrisy plus) x 2 (attitude importance: high or low) x 2 (time: pre-strategy dissonance or post-strategy dissonance) model, with condition and attitude importance as between- subjects factors and self-reported dissonance over time as a within-subjects factor, was conducted as the main, omnibus analysis. The multivariate effects from this analysis are shown in Table 11.

Table 11

Significant Effects from MANOVA

	Wilk's Lambda	<i>F</i>	Sig. Level	Effect size (partial η^2)	Observed Power
Time	.69	14.02	< .001	.31	1.00
Condition	.76	9.94	<.001	.25	1.00
Attitude Importance	.96	1.21	.31	.04	.32
Condition x Importance	.95	1.76	.16	.05	.44

Note. None of the other interactions among the variables were significant.

At the multivariate level, there was a significant main effect of hypocrisy condition on self-reported dissonance overall, and a significant main effect of time, such that levels of self-reported dissonance changed significantly from pre- to post-dissonance-reduction strategy. Univariate *F* tests and pairwise comparisons were conducted to determine which dependent variables and which groups contributed to the significant multivariate findings. Univariate *F*s were examined in lieu of Roy-Bargmann stepdown analysis because no theoretical basis existed for prioritizing the dependent variables. A familywise alpha level was set at .10 given the complexity of the design, which meant each test had an alpha level set at .017 (Tabachnick & Fidell, 2007, p. 271). In the sections that follow, I report the significant univariate findings, separately for each subscale of the dissonance measure.

Dissonance Subscale: Shame

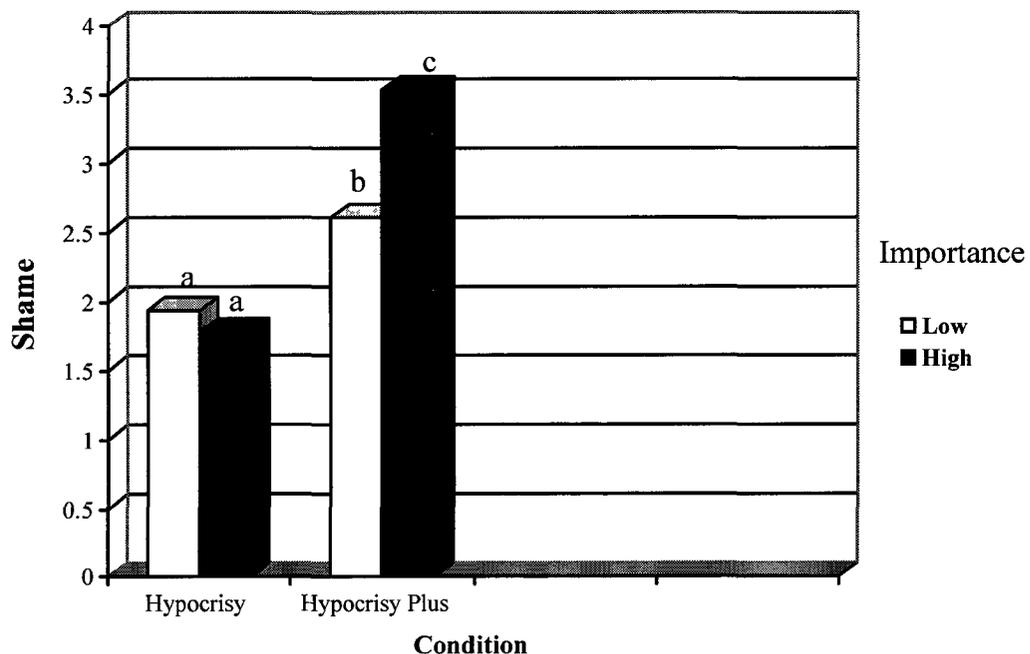
A significant main effect of time revealed that, in general, participants felt more shame at time 1, before they were offered a dissonance-reduction strategy ($M = 2.58$, $SD = 1.44$) than at time 2, after they completed a dissonance-reduction strategy ($M = 2.25$, $SD = 1.32$), $F(1, 94) = 22.00$, $p < .001$, $\eta^2 = .19$. A significant main effect of condition

was also observed for the shame subscale $F(1, 94) = 26.77, p < .001$, partial $\eta^2 = .22$.

Participants in the hypocrisy plus condition ($M = 3.05, SD = 1.53$) reported significantly higher levels of shame overall than participants in the standard hypocrisy condition ($M = 1.85, SD = 0.94$) with $p < .001$.

Although the interaction effect between condition and attitude importance was nonsignificant at the multivariate level ($p = .16$), there was a marginally significant interaction effect at the univariate level for shame, $F(1, 94) = 5.18, p = .03$, partial $\eta^2 = .05$. Given that the observed power level was .62, and not the recommended level of .80 (Cohen, 1992), statistical significance may have been achieved with a larger sample. This interaction is shown in Figure 3.

Figure 3. *Interaction Between Condition and Importance for Shame*



Note. Different subscripts indicate significant differences at $p < .01$, except for the difference between a and b, which is $p = .04$.

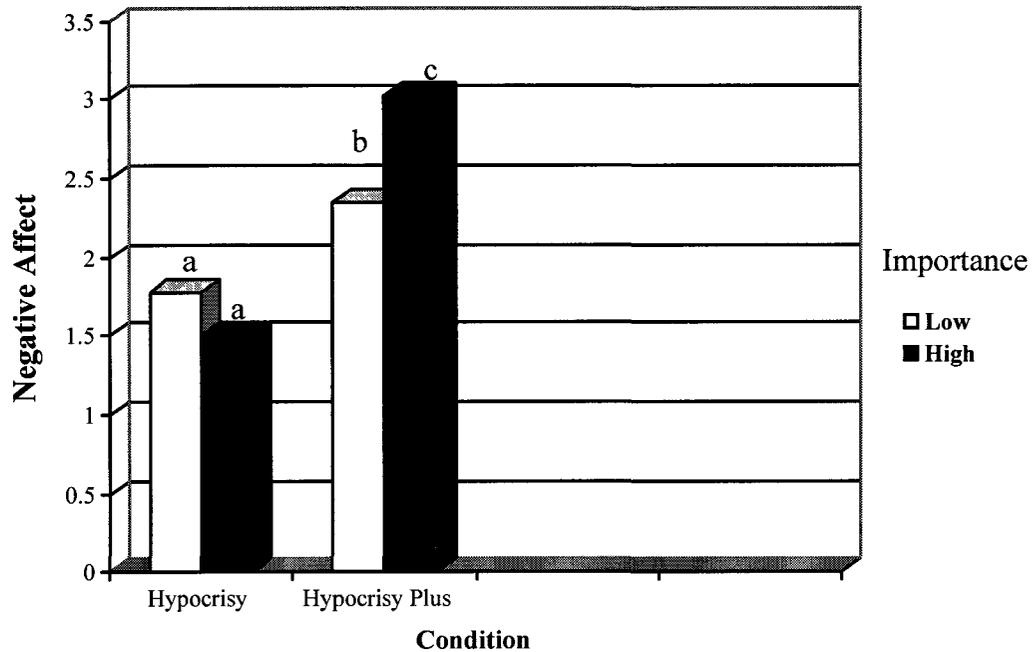
In the standard hypocrisy condition, attitude importance did not differentially affect reports of shame, but in the more intense, hypocrisy plus condition, high attitude importance participants experienced significantly more shame than their low importance peers. Moreover, it should be noted that participants who were both high in attitude importance and experienced hypocrisy plus a video reported the highest levels of shame relative to all other experimental groups.

Dissonance Subscale: Self-Directed Negative Affect

A significant main effect of time was found for the dependent variable of self-directed negative affect, $F(1, 94) = 16.27, p < .001, \eta^2 = .15$. Participants felt worse at time 1 ($M = 2.28, SD = 1.31$) than at time 2 ($M = 2.05, SD = 1.25$). A significant main effect of hypocrisy condition was also observed for the self-directed negative affect subscale $F(1, 94) = 20.76, p < .001, \text{partial } \eta^2 = .18$. Participants in the hypocrisy plus condition felt more self-directed negative affect ($M = 2.69, SD = 1.48$) than participants in the standard hypocrisy condition ($M = 1.64, SD = 0.82$).

Although the interaction effect between condition and attitude importance was nonsignificant at the multivariate level ($p = .16$), there was a marginally significant interaction effect at the univariate level for self-directed negative affect, $F(1, 94) = 4.01, p = .048, \text{partial } \eta^2 = .05$. Given that the observed power level was .51, and not the recommended level of .80 (Cohen, 1992), statistical significance may have been achieved with a larger sample. This interaction is shown in Figure 4.

Figure 4. *Interaction Between Condition and Importance for Negative Affect.*



Note. Different subscripts indicate significant differences. The difference between a and b is marginally significant at $p = .07$, with other comparisons significant at $p < .05$.

In the standard hypocrisy condition, importance did not differentially influence self-directed negative affect, but in the hypocrisy plus condition, high importance participants experienced significantly more negative affect compared to low importance participants. In fact, the combination of high attitude importance and hypocrisy plus, produced the highest levels of self-directed negative affect compared to all other groups in the study.

Dissonance Subscale: Discomfort

Follow-up univariate F s were reviewed to determine significant main effects on the dependent variable of discomfort. A significant main effect of time was also found for

discomfort, $F(1, 94) = 37.72, p < .001, \eta^2 = .29$. Participants felt greater discomfort at time 1 ($M = 3.08, SD = 1.56$) than at time 2 ($M = 2.47, SD = 1.36$) with $p < .001$.

Additionally, a significant main effect of condition was observed for the discomfort subscale $F(1, 94) = 24.77, p < .001, \text{partial } \eta^2 = .21$. Participants in the hypocrisy plus condition ($M = 3.39, SD = 1.60$) felt more discomfort than participants in the standard hypocrisy condition ($M = 2.15, SD = 1.04$) with $p < .001$.

Reduction Strategy Preferences

To determine whether participants demonstrated preferences in terms of the reduction strategies chosen, a chi-square goodness of fit test was calculated to assess whether the four reduction options were equally selected by participants. A significant goodness of fit test, $\chi^2 = (3, N = 98) = 22.98, p < .001$, indicated that the chosen reduction strategies were not equally selected (see Table 12)⁵. There is a clear preference among participants to write about what they can do to support cage-free egg practices or to externally justify their behaviour by writing about the expense and inconvenience of buying cage-free eggs. Also, there is a clear non-preference for writing about the role farmers play in the consumption of battery-caged eggs.

Table 12

Frequencies of Chosen Options

Type of Option Chosen	%	Expected %	Observed N	Expected N
Issue Confrontation (Support)	42	25	41	24.5

⁵ This analysis was collapsed across independent variables, but a chi square test of independence revealed that the choice of reduction option was significantly associated with attitude importance, $\chi^2 = (3, N = 98) = 8.23, p = .04$, but not condition, $\chi^2 = (3, N = 98) = 5.29, p = .15$. Specifically, low attitude importance participants chose the denial of responsibility option more often ($n = 8$) than those with high attitude importance ($n = 1$), $\chi^2 = 5.69 (1), p = .03$

External justification (Expense)	30	25	29	24.5
Distraction (Psychology Study)	19	25	19	24.5
Deny responsibility (Blame Farmers)	9	25	9	24.5

To further examine preferences among the reduction strategies, a 2 x 2 x 4 repeated measures ANOVA was conducted, with condition (hypocrisy or hypocrisy plus) and attitude importance (high or low) as between factors and with ratings for each strategy (external justification, denial of responsibility, distraction, issue confrontation) as the within factor. This would provide additional evidence about preferences among the strategies and whether such preferences varied as a function of the independent variables. Participants did exhibit preferences based on the type of reduction option, $F(3, 94) = 14.95, p < .001$, partial $\eta^2 = .14^6$. These preferences were unaffected by condition $F(1, 94) = .44, p = .51$, or attitude importance, $F(1, 94) = .04, p = .84$. As shown in Table 13 follow-up pairwise comparisons indicated that many of the option ratings were significantly different from one another, with the overall preference ratings for the options corresponding to the pattern depicted above in terms of chosen reduction options. That is, the ratings for the strategies from highest to lowest were issue confrontation, external justification, distraction, and denial of responsibility.

Table 13

Preference Ratings of Reduction Options

	Mean	SD
Issue confrontation (support)	4.83 ^a	1.84

⁶ Values according to Greenhouse-Geisser correction for violation of sphericity.

External justification (expense)	4.20 ^b	1.89
Distraction (psychology study)	3.41 ^c	1.82
Deny responsibility (blame farmers)	3.34 ^c	1.70

Note: Means with different subscripts differ significantly at the Type I corrected alpha level of $p < .008$, except for the comparison between a and b which is marginally significant at $p = .035$.

Dissonance magnitude and preference of reduction option. Beyond examining whether the independent variables influenced participants' choices of dissonance reduction strategies, it was also desirable to assess whether the level of dissonance experienced by participants was related to the selection of a reduction option. Perhaps participants experiencing high levels of dissonance would be more likely to rate the issue confrontation option as more preferable to the other options. To determine if the level of dissonance participants experienced was related to their ratings of the reduction options a mixed model ANOVA was conducted with dissonance magnitude (low or high) as a between factor and rating of type of option (justification, denial, distraction, and issue confrontation) as a within factor. It was hypothesized that participants experiencing greater levels of dissonance may be more motivated to resolve their dissonance by focusing on doable actions that would resolve the discrepancy rather than justify their behaviour or focus their attention on something else. However, after dividing participants into high and low dissonance magnitude groups based on an average of all the dissonance subscales at time 1 this was not the case. Dissonance magnitude did not affect participants ratings of the reduction options, $F(1, 96) = .005, p = .94$.

Dissonance as it relates to choosing the issue confrontation strategy. It was hypothesized that as dissonance increases one may be more likely to choose the issue confrontation reduction strategy than other reduction options. Although the preference

ratings of the options did not vary by dissonance level it is possible that the options participants actually chose varied according to the amount of dissonance they were experiencing. To determine if level of dissonance was significantly related to the choice of the issue confrontation reduction mode, a logistic regression analysis was conducted with choice of reduction strategy as the binary dependent variable (*coded as confrontation mode or other*). To build the model, the three dissonance subscales (i.e., shame, discomfort, and self-directed negative affect) were simultaneously entered to predict choice of the issue confrontation strategy (with *issue confrontation not chosen* as the reference category). The forced entry method was chosen for the regression analysis because no theoretical backing warranted an earlier inclusion of one variable over another, as in hierarchical regression. Also, a stepwise method was not chosen due to concerns about the influence from random variation in the data on the final outcome of the model (Field, 2009, p.212).

A logistic regression model indicated the variables as a model did not significantly predict choosing the issue confrontation option, $\chi^2(df = 3) = 6.12, p = .11$. However, discomfort significantly predicted the outcome. Both self-directed negative affect and shame were nonsignificant predictors (see Table 14). Higher feelings of discomfort were associated with a lower likelihood of confronting the issue, adjusted odds ratio (OR_{adj}) = .65, 95% CI [.43, .99], Wald $\chi^2(df = 1) = 4.06, p = .04$.⁷ Together, the model only explained up to 8% of the variance in choosing to confront the issue (Nagelkerke $R^2 = 0.08$; Cox & Snell $R^2 = 0.06$).

⁷ To ensure discomfort was accounting for unique variance associated with the outcome a second logistic regression analysis was conducted with condition and attitude importance entered in step 1 of the model and all three dissonance subscales entered in step 2. While controlling for the effects of the two independent variables, discomfort was still a significant predictor of the outcome ($p = .04$).

Table 14

Variables in Logistic Regression Analysis for Choice of Issue Confrontation

	B (SE)	Adjusted Odds Ratio	95% CI	Sig.
Included				
Shame	.23 (.28)	1.26	[.73, 2.19]	.41
Negative Aff.	-.06 (.31)	.94	[.52, 1.73]	.85
Discomfort	-.43 (.21)	.65	[.43, .99]	.04

Dissonance reduction based on chosen strategy.⁸ An exploratory analysis was conducted to evaluate whether particular dissonance reduction strategies were more effective than others at reducing dissonance for participants. Although participants were not randomly assigned to a dissonance reduction strategy, it was possible to control for their levels of dissonance at time 1 by using that variable as a covariate. An ANCOVA with type of option used (issue confrontation, external justification, or distraction) and overall dissonance at time 1 as a covariate was conducted to determine if post-strategy dissonance (i.e., dissonance at time 2) varied as a function of the strategy used. The denial of responsibility option was not included as a level among option type because only 9 participants chose this option. Importantly, the strategy chosen did have a main effect on dissonance at time 2, $F(2, 85) = 5.68, p = .005$, partial $\eta^2 = .12$. Further investigation of this main effect revealed that participants who chose distraction reported

⁸ Reasoning for this analysis and statistical assumptions underlying it are provided in Appendix E.

significantly lower levels of time 2 dissonance ($M = 1.98$, $SD = 1.12$) compared to those who chose either external justification ($M = 2.44$, $SD = 1.42$) or issue confrontation ($M = 2.03$, $SD = 1.15$) ($ps = .002$ and $.005$ respectively).

Discussion: Experiment 2

One of the primary goals of Experiment 2 was to determine if dissonance levels among participants could be increased by altering the standard hypocrisy manipulation. Results from Experiment 2 show that including a short video about the consequences of battery-caged egg production was indeed successful at elevating participants' feelings of dissonance above the average levels reported in Study 1. Across all three dissonance subscales, participants reported higher levels of dissonance when placed in the hypocrisy plus condition than the standard hypocrisy condition. While the dissonance levels for the standard hypocrisy conditions did not vary greatly between Experiments 1 and 2, the means for participants in the hypocrisy plus condition were significantly higher than all other conditions.⁹ Furthermore, the hypocrisy plus manipulation also increased levels of dissonance among low attitude importance participants. Importantly, results from Experiment 2 suggest that including the video in the hypocrisy condition increases dissonance among participants who report caring little about the issue at hand.

In addition to increasing dissonance in Experiment 2, another primary goal was to replicate the attitude importance findings from Experiment 1. Although the main effect of attitude importance was not replicated, an interaction between attitude importance and hypocrisy condition was observed for the *shame* and *negative affect* subscales. Compared to all other conditions, the highest levels of dissonance were observed among participants in the hypocrisy plus video condition for whom attitudes about animal rights were also

⁹ This result is not reported in the main Results section.

very important. At least partially consistent with the findings from Experiment 1, calling attention to participants' hypocrisy (and using powerful video images in the process) seemed to emphasize participant differences in attitude importance. Those for whom the issue was important stood out in terms of the high levels of dissonance reported. In the standard hypocrisy condition, however, dissonance levels did not differ as a function of attitude importance, and, in fact, were no different from the levels observed among low-importance, hypocrisy-plus participants. Possible reasons why attitude importance had an effect for the standard hypocrisy condition in Experiment 1, but not in Experiment 2, are reviewed in the general discussion.

A second goal of Experiment 2 was to explore participants' preferences for different types of dissonance reduction strategies and to consider possible predictors of such preferences. In Experiment 2, the options were equalized in terms of effort, unlike in Experiment 1, and this may have caused participants to look more favourably upon the issue confrontation option (i.e., writing in support of consuming cage-free eggs). A clear pattern of preferences was observed in Experiment 2. Participants' preference ratings for the reduction options indicated that confronting the issue by writing about what they can do to support cage-free egg practices was the most favoured option. Externally justifying their past consumption of battery-caged eggs by writing about the expense and inconvenience of purchasing such eggs was the second most preferred option followed by ignoring the issue altogether and instead writing about what it is like to participate in psychology studies. The least preferable reduction mode was writing about the role farmers play in producing battery-caged eggs. Confidence in these preference ratings as indicators of how participants really felt about the options is strengthened by the results

of the chi-square goodness of fit test. The reduction modes actually chosen by participants follow the same pattern as the ratings, with issue confrontation on top and denial of responsibility at the bottom.

Research on dissonance reduction under the hypocrisy paradigm has suggested that people will be particularly motivated to reduce such dissonance through the use of direct reduction strategies rather than indirect strategies (Stone et al., 1997). Direct strategies involve altering elements of the discrepancy (e.g., changing one's attitude or behaviour) whereas indirect strategies reduce dissonance without confronting the discrepancies (e.g., through self-affirmation or distraction). In Experiment 2, the two options rated as highly preferable are considered direct reduction strategies (i.e., issue confrontation and external justification). Seventy-two percent of the sample reduced dissonance using these options whereas only 19% of the sample chose the indirect mode of distraction. Although denial of responsibility is also a direct reduction strategy few participants chose this option (9%) but this may be because participants felt unprepared to write about the role farmers play in producing battery and cage-free eggs. By comparison, they could more easily write about what they could do to support cage-free eggs and the common barriers of expense and inconvenience. As such, results from Experiment 2 lend support to Stone and colleagues' (1997) contention that hypocrisy arouses a form of dissonance that motivates the selection of direct reduction strategies.

An examination of factors that may influence participants' ratings and choices of dissonance-reduction options revealed that only *attitude importance* and *discomfort* were related to the reduction modes chosen. Specifically, participants low in attitude importance were more likely to select the denial of responsibility option than participants

high in attitude importance. This finding could indicate that when one does not care about the topic that cognitive discrepancies centre on, one may be more likely to use an external justification strategy to reduce dissonance rather than an internal justification strategy.

Perhaps low attitude importance signifies to an individual that a particular cognitive discrepancy is not important to one's self concept and as such there would be no need to "look inside oneself" to internally justify one's behaviour. Holland and colleagues (2002) found that self-esteem is related to the choice of external versus internal self-justification strategies, and future studies examining these reduction modes may want to also consider attitude importance as a factor.

Discomfort was a significant predictor of avoiding direct issue confrontation (i.e., writing about what one could do to support cage-free practices). Increased feelings of discomfort made it less likely that participants would choose to confront the issue of cage-free eggs directly. Perhaps as discomfort increases, the thought of focusing on the role one's own actions play in an outcome is not particularly pleasing. Rather, people would prefer to think about external barriers to explain their behaviour. With this possibility in mind, it is important to consider not only the motivating properties of dissonance, but to what ends this motivational force is driving. Dissonance may in some situations motivate behavioural change or issue confrontation, yet it is also possible that dissonance will elicit defensive mechanisms within an individual that would make behaviour change less likely (e.g., people experiencing dissonance may be more likely to bolster their attitudes or deny negative outcomes associated with their behaviour). A continuing challenge for research focused on dissonance reduction will be determining if and how particular emotions motivate specific forms of dissonance reduction.

The other main goal of Experiment 2 was to replicate the dissonance reduction finding from Experiment 1 and to explore the effectiveness of the different reduction strategies used in Experiment 2. A main effect of time on all three dissonance subscales indicated that participants felt less dissonance after engaging in a reduction mode. These findings corroborate the results from Experiment 1 and other work that has tracked changes in dissonance (Elliot & Devine, 1994).

In terms of the effectiveness of different reduction strategies in actually alleviating dissonance, *distraction* was again shown to be a particularly powerful reduction mode. Participants who chose the distraction option reported significantly less dissonance post strategy use than participants who chose the other available options. Apparently focusing one's attention on a topic not related to one's cognitive discrepancies reduces dissonance more than strategies that require attention focused on the discrepant act. To my knowledge no other dissonance study has investigated the differential effectiveness of multiple reduction modes. Beyond comparing different modes under different dissonance-arousing situations, researchers should consider the effectiveness of reduction modes over time, or over repeated instances of dissonance arousal. Is distraction an effective means of dissonance reduction in the long run, when, for example, a smoker is constantly reminded of the negative health outcomes of cigarettes? Or would direct reduction modes that alter the discrepant cognitions (e.g., smoking isn't that bad, my dad smoked a pack a day and never got cancer) be necessary to reduce the psychological discomfort aroused by multiple instances of dissonance? Much work remains to be done in this area of dissonance reduction.

Lastly, the only moderating variable significantly related to dissonance was once again *self-esteem*. Higher levels of self-esteem were negatively related to dissonance magnitude, suggesting that high self-esteem does buffer individuals from dissonant experiences. The role of self-esteem in the process of cognitive dissonance is articulated further in the general discussion.

General Discussion

Inducing Dissonance

Cognitive dissonance is one of the most important theories to emerge from the field of social psychology. It has a rich history, and social psychologists have devoted countless hours, likely recruited over 50,000 participants (Laird, 2007, p. 158), and conducted over one thousand studies to document the process of cognitive dissonance (Wicklund & Brehm, 1976). Given the number of studies conducted on dissonance it should come as no surprise that researchers have developed different methods for inducing dissonance (e.g., free choice, effort justification, induced compliance, and hypocrisy). The hypocrisy paradigm is the latest development in the history of dissonance-inducing procedures, and it has been applied to the behavioural realms of water conservation, safe driving, safer sex, and recycling (Dickerson et al., 1992; Fointiat et al., 2001; Fried & Aronson, 1995; Stone et al., 1994). In these two experiments I successfully applied the hypocrisy manipulation to a new content area - the issue of battery-caged chickens, which can be broadly defined as a topic of ethical food consumption. By following and adapting the procedures of Fried and Aronson (1995), participants in these experiments reported feeling dissonance, or psychological discomfort, after advocating for the consumption of cage-free eggs but admitting that

their own behaviour did not always match their advocated standards. In addition to creating the dissonance effect produced by the hypocrisy paradigm in a new area, I also created a *hypocrisy plus* procedure that produced higher levels of dissonance when compared to the standard hypocrisy procedure.

Including a short video in the hypocrisy procedure depicting the dismal living conditions of battery-caged chickens increased participants' feelings of dissonance. Although the exact reason why the inclusion of this video increased dissonance is unclear, two likely possibilities should be considered. First, the video, for the most part, included the same information about battery-caged chickens that the experimenter shared with participants. However, three additional pieces of information were presented in the video. Specifically, the video also provided information about sick chickens, chickens that must live with decaying carcasses in their cages, and the accumulation of dead chickens on the floor of the facility. It is possible that these pieces of information conveyed the message with a higher level of intensity, resulting in higher levels of reported dissonance. As a second alternative, it may be that the video communicated the information about battery-caged chickens in a more commanding way than the experimenter. Perhaps the images of the chickens combined with the presentation of facts captured the attention of participants and communicated the issues surrounding battery-caged egg production more engagingly than the experimenter. The video of the chickens may have presented a more emotional appeal to participants than the message from the researcher. Research on persuasion has documented the effectiveness of emotional appeals (Hartmann, 1936; Leventhal, 1970) and perhaps in Experiment 2, participants

found the video particularly engaging and persuasive and therefore felt more dissonance about their hypocritical behaviour.

Although simply watching the video may have also increased physiological arousal and or negative affect among participants, this does not imply that the video did not also increase dissonance. Participants who watched the video reported higher shame and self-directed negative affect scores, not a simple increase in overall negative affect, suggesting that watching the video increased dissonance and not just a general negative emotional state. Furthermore, the increase in dissonance among those with high attitude importance in the hypocrisy plus condition would suggest that the video had specific dissonance-arousing properties rather than a simple across-the-board emotional effect. As such, a video manipulation may be a good tool for use in laboratory studies to increase feelings of dissonance.

The video modification to the hypocrisy procedure may prove useful in future dissonance experiments because by measuring participants' levels of dissonance with the dissonance thermometer (Elliot & Devine, 1994) I was able to demonstrate that including the video increases dissonance levels above the levels experienced with a standard hypocrisy procedure. Measuring dissonance directly was important for this reason, and it is important because it allows researchers to compare cognitive dissonance experiences across studies. The means obtained in these two experiments are on par with other experiments that have tracked dissonance with the thermometer (Devine et al., 1999; Elliot & Devine, 1994; Galinsky, Stone, & Cooper, 2000; Harmon-Jones, 2000; Holland et al., 2002). Specifically, authors using the thermometer have reported discomfort scores ranging from 2.4 to 4.6, where 7 is the high end point of the scale representing a strong

degree of discomfort. Across Experiments 1 and 2, discomfort values ranged from 2.7 to 3.4. One other study has reported the means from the self-directed negative affect subscale of the thermometer (Galinsky et al., 2000). The means from that study (i.e., 2.2 and 2.7) correspond to the means from Experiments 1 and 2 (means ranging from 2.2 to 2.7). As researchers continue to use different dissonance induction methods and explore dissonance in different realms it becomes even more important to measure dissonance directly to allow for the development and use of methods that reliably produce cognitive dissonance in the laboratory. Measuring dissonance directly provides a useful validation of dissonance-inducing procedures (rather than relying on the use of an attitude change measure by participants to infer dissonance) and also opens a window into examining dissonance reduction. Lastly, using the dissonance thermometer allows researchers to explore the qualitative nature of cognitive dissonance, in particular, the different specific emotions that can characterize one's experience of dissonance.

Although Elliot and Devine (1994) initially focused on discomfort as the primary affective response to consider when assessing cognitive dissonance, dissonance can also be characterized by self-directed negative emotions (e.g., shame) (Devine et al., 1999). For example, Galinsky and colleagues (2000) found that participants placed in a dissonance-inducing condition reported significantly higher levels of discomfort *and* self-directed negative affect when compared to participants in control conditions. Similarly, Harmon-Jones (2000) found that both discomfort and general negative affect increased among participants in experimental conditions. Furthermore, Aronson (1992) has argued that dissonance can be experienced as guilt. In both Experiments 1 and 2, I found significant affective differences between control and experimental participants on all

three subscales of the dissonance thermometer. Cognitive dissonance is experienced as an aversive state and using the dissonance thermometer in these two experiments demonstrated that recognizing one's hypocritical actions in the case of ethical food consumption produced effects on a range of emotions, not just discomfort. Therefore, a nuanced description of the affective properties of cognitive dissonance is necessary. Rather than simply characterizing dissonance as discomfort, one should consider how dissonance is induced and in regards to what behaviour in order to ascribe the proper affective components of dissonance. Like all good social psychological phenomena, cognitive dissonance must be considered and defined within a host of situational constraints.

Attitude Importance

The original formulation of cognitive dissonance theory specified the role of importance in the arousal of dissonance. As the importance of dissonant cognitions increases so too do one's feelings of dissonance (Festinger, 1957). By including attitude importance as an independent variable in Experiments 1 and 2, I examined the impact of this variable on participants' experiences of dissonance. The contention that attitude importance results in more dissonance was partially supported by the findings. In two of three conditions where importance was predicted to influence dissonance (i.e., all conditions except the control condition in Experiment 1), the hypothesized effect was found. Across these conditions, participants who reported at least one month in advance that the issue of battery-caged chickens was personally important to them, experienced more dissonance than participants who reported that this issue was less important. To my knowledge, these are some of the first results to link attitude importance to one's

subjective experience of cognitive dissonance. Elliot and Devine (1994) included attitude importance as a measure in their studies but they included this measure after the dissonance-inducing task and after participants completed an attitude change measure. They found no relationship between importance and dissonance but this could very well be because participants' ratings on the attitude importance measure were affected by their previous completion of the dissonance task. That is, students who genuinely felt the issue of a tuition increase was highly important to them may have been unwilling to report the strength of their attitude given that they just wrote in favour of a tuition increase. By comparison, Starzyk and colleagues (2009) had participants report their attitude importance levels several weeks before participating in their study (as was the case for my experiments). As such, they were able to accurately measure attitude importance and did find an effect of importance on dissonance. Specifically, a positive relationship was found between attitude importance and dissonance magnitude (as inferred from the use of reduction strategies), which is the same effect reported here from Experiments 1 and 2. Other work that has investigated the relationship between attitude importance and dissonance magnitude, via attitude change, also supports the findings of the present experiments (Eisenstadt & Leippe, 2005).

Taken together, the results of several studies are consistent with each other and also provide support for Festinger's (1957) view that importance plays a key role in the arousal of cognitive dissonance. An additional form of support for this relationship can be found by looking to a particular dissonance reduction strategy, namely trivialization (Simon et al., 1995). When individuals trivialize the importance of a discrepant act, dissonance decreases. If attitude importance was not related to dissonance magnitude

then trivialization would probably not be an effective means of dissonance reduction.

That is to say, it is only because of the positive relationship between importance and dissonance arousal that when one *decreases the perceived importance* of a cognition (i.e., engages in trivialization), feelings of dissonance are actually reduced.

Although the bulk of evidence suggests that as attitude importance increases so does dissonance, data from the standard hypocrisy condition in Experiment 2 was not consistent with this trend. Why did this effect not carry over to Experiment 2, despite using the same experimental procedure? One important difference between Experiments 1 and 2 had to do with sample characteristics. Comparisons of the samples ultimately revealed that participants in the standard hypocrisy condition in Experiment 2 reported eating a significantly higher proportion of cage-free eggs (i.e., twice as many) than participants in Experiment 1. Perhaps the sample in Experiment 1 felt more dissonance than participants in Experiment 2 because there was a larger discrepancy between their advocated behaviour and their actual behaviour. In other words, despite being identical, procedurally, the hypocrisy manipulation may have been 'felt' more intensely by Experiment 1 participants. This, in turn, may have affected the level of dissonance experienced. Indeed, scores on all three of the dissonance subscales were lower for the sample in the standard hypocrisy condition in Experiment 2 (negative affect = 1.64, shame = 1.85, discomfort = 2.15) than for those in the same condition in Experiment 1 (negative affect = 2.21, shame = 2.01, discomfort = 2.67), but not significantly. It is possible that the discrepancy between the advocated behaviour and actual behaviour of participants in Experiment 2 was insufficient to arouse much dissonance and therefore impeded the observation of any attitude importance effects. Perhaps in future studies

information about this variable could be collected prior to enrollment. Although participants reported in mass testing whether they ate eggs, and the type of eggs they mostly ate, more detailed dietary information was not collected. In future research, asking more detailed questions of this nature could serve as a stratification variable for assigning participants to condition.

Another potentially important difference between the two samples used in this research was their levels of self-esteem. Participants in the standard hypocrisy condition in Experiment 1 had significantly lower levels of self-esteem than their counterparts in Experiment 2. The high self-esteem levels of participants in Experiment 2 may have buffered the experience of dissonance for this sample, (which again is indicated by the lower dissonance scores for this sample on all of the subscales) thereby negating any attitude importance effects. The samples between these experiments were otherwise equivalent on a variety of dimensions (e.g., age, level of attitude importance, personality factors).

Research from Fried (1998) leads me to believe that self-esteem may carry more explanatory weight in understanding the puzzling findings from the standard hypocrisy conditions. She found that the number of transgressions listed (i.e., the number of items failed to be recycled over one month) by participants did not relate to their use of the available reduction mode. Similarly, in these experiments no significant positive correlation was found between level of dissonance and the number of battery-cage or cage-free eggs consumed or the proportion of cage-free eggs consumed. Conversely, a significant negative correlation was found between self-esteem and dissonance levels in

both experiments. This may suggest that the self-esteem differences between the samples influenced the effectiveness of the standard hypocrisy manipulation.

Failure to replicate the effect of attitude importance on dissonance in the standard hypocrisy condition of Experiment 2 highlights the need to continue research on the role of attitude importance in cognitive dissonance arousal more generally. Despite being theorized by Festinger as an important factor in cognitive dissonance over fifty years ago, little empirical research has focused on this relationship. Furthermore, different explanations as to why attitude importance increases the magnitude of cognitive dissonance have been put forth (Eisenstadt & Leippe, 2005) but not tested empirically. As such, this is one more area where our understanding of cognitive dissonance can be well served by sustained research attention.

Tracking Dissonance Reduction

The dissonance thermometer was used in both Experiments 1 and 2 not only as a means of testing the dissonance manipulations but also to provide information on the process of dissonance reduction. Much research on cognitive dissonance has focused on the conditions that promote the *arousal of dissonance* whereas comparatively little research has examined the *reduction of dissonance*. In one of the first studies to examine dissonance reduction, the authors found that physiological arousal did not decline following attitude change and that instead arousal declined when participants browsed magazines (Elkin & Leippe, 1986). This finding led the authors to question the motivational underpinnings of cognitive dissonance theory. Yet an important aspect of dissonance that was not measured in this study was negative affect. Dissonance is both physiologically arousing and affectively aversive. By using measures like the dissonance

thermometer, researchers can establish whether dissonance reduction strategies mitigate negative feelings, which would support the motivational properties of dissonance.

In an effort to track affective reactions to a dissonance-arousing situation, Elliot and Devine (1994) used the dissonance thermometer under different conditions. Participants who reported their psychological discomfort directly after writing a counterattitudinal essay displayed heightened levels of discomfort compared to a control condition. And importantly, participants who wrote the counterattitudinal essay and completed an attitude change measure before reporting on their affective state demonstrated discomfort levels on par with participants in control and baseline conditions. Thus, the attitude change option did serve to reduce dissonance. Similar dissonance reduction results have been obtained after participants use a self-affirmation strategy (Galinsky et al., 2000), denial of responsibility (Gosling et al., 2006), and attitude change to address vicarious dissonance (Norton, Monin, Cooper, & Hogg, 2003).

Results from the present experiments are in line with these findings. In all three dissonance-inducing conditions, participants reported lower levels of dissonance after completing a dissonance reduction strategy. Importantly, this effect was found across all the dissonance subscales and across a variety of reduction strategies. Although particular reduction strategies (e.g., attitude change) may not immediately reduce the physiological arousal associated with cognitive discrepancy, it seems that reduction strategies in general help to ward off the negative affect of cognitive dissonance. The results of this work and that of others seem to clearly support Festinger's (1957) contention that dissonance elicits a motivational state in which people are readied for discrepancy reduction. Moreover, dissonance is reduced following a discrepancy-reducing behaviour.

An important contribution of the current findings to the dissonance literature comes from the results that pertain to the effectiveness of the different dissonance reduction strategies. Many investigations concerning the effect of reduction strategies on dissonance are conducted in isolation, including only one reduction strategy in the experiments (Elkin & Leippe, 1986; Elliot & Devine, 1994; Gosling et al., 2006). As participants in the current experiments chose from a selection of different reduction strategies, it was possible to compare whether certain reduction modes were more successful at reducing dissonance than others, while controlling for levels of pre-strategy dissonance. In both Experiments 1 and 2, participants who completed the distraction strategy reported significantly less dissonance than participants who completed the other available strategies. This is an intriguing finding, especially given the work of Elkin and Leippe (1986). As mentioned above, they found that physiological arousal following dissonance induction only decreased when participants were offered an opportunity to read magazines instead of completing an attitude change measure. The authors concluded that dissonance may be reduced simply when people are not reminded of their discrepant act either through distraction or plain forgetting. The findings from Experiments 1 and 2 echo these sentiments. Participants who read about an animal visitation program for seniors or who wrote about what it is like to complete psychology studies, reported the least amount of dissonance at time 2. These distraction tasks may have been particularly effective at reducing dissonance because they helped participants to forget about their hypocritical behaviour. The role distraction can play in dissonance reduction deserves more attention. Outside of the laboratory it may be more likely that after acting in a way inconsistent with one's values, individuals are confronted with stimuli that distract them

from their experience of dissonance (e.g., upcoming tasks, reading, TV, a phone call or text message) rather than situations that force them to consider their attitudes or change their behaviour. Or perhaps individuals actively seek out distracting behaviours to avoid cognitive discrepancies. While ideally the result concerning the effectiveness of distraction would come from a study controlling for reduction strategy use (i.e., assigning different types of reduction strategies as an independent variable), it is a promising finding that is worth further investigation.

In addition to observing the dissonance-reducing effects of the different strategies, in these experiments a repeated measures design was used, with affect measured before and after reduction strategy use. In the studies cited above that used the dissonance thermometer, affect was never measured as a within-subjects variable. Instead, separate conditions were created with one group of participants measured before using a reduction strategy and a separate group of participants assessed after using a reduction strategy. Given that the results from the present experiments produced similar reduction findings it seems unnecessary to treat the affect measure as a between-subjects variable. Future research relying on the dissonance thermometer can be conducted more efficiently by treating the thermometer as a within-subjects variable thereby making the most of one's sample size.

Preferences for Dissonance Reduction Strategies

Although much cognitive dissonance research has focused on the conditions that arouse dissonance, social psychologists have begun to turn their attention to what happens after dissonance is aroused. How do people actually go about reducing dissonance? In some of the early work on dissonance reduction, Gotz-Marchand and

colleagues (1974) found that the presentation order of reduction strategies and the cognitions' resistance to change are two important factors in the selection of a reduction strategy. Resistance to change is an important concept within dissonance reduction because some cognitions are less likely to be changed because 1) of reality constraints, 2) changing one cognition may produce dissonance among other cognitions, 3) of the pain or effort required to change it, or 4) because the cognition is important or central to the self (Festinger, 1957; Gotz-Marchand et al., 1974). These researchers found that participants were more likely to change a less resistant cognition (i.e., downgrade the reliability of an intelligence test) as a means of dissonance reduction than a cognition highly resistant to change (i.e., downgrade one's own intelligence). However, if the order of these options was such that the highly-resistant cognition was presented first, participants did reduce dissonance by using it. Yet, this finding tells us little about actual preferences for dissonance reduction modes as this result says more about the way dissonance is studied than what a person might do when they have multiple reduction modes at their fingertips. These two factors, presentation order and resistance to change, have been considered by other researchers (Gosling et al., 2006; Simon et al., 1995) when studying dissonance reduction, but the focus on order of presentation may be unwarranted. Clearly in a laboratory environment experimenters can control the type of dissonance reduction strategy offered to participants. This in fact is part of the problem with understanding dissonance reduction based on much of the existing research. Outside of the laboratory, many different ways of reducing dissonance are available to individuals, and available to them simultaneously. Thus it may make more sense to understand dissonance reduction preferences when multiple options are available to

people (Stone et al., 1997) rather than focusing on the order of presentation, which is why participants in the current experiments were offered multiple strategies at once.

The results from Experiment 1 regarding the ratings and choices of the reduction strategies highlight Festinger's point about how behaviours may be particularly resistant to change. Participants were not required to change their behaviour (i.e., they didn't have to stop eating battery-caged eggs) but they were offered the opportunity to engage in a more effortful behaviour (i.e., write a letter in support of cage-free eggs). Yet it would seem that this behaviour was thought of as too costly by most participants to engage in (8%). Compared to reading one of the three brochures, writing a support letter may have seemed to be a particularly onerous task. It is also possible that in addition to being a more effortful task, it may have been a more aversive task as well. Writing can create anxiety among students (Hjortshoj, 2001), and the participants may also have been concerned about people reading and evaluating their letter. Participants were told that all of the options would take less than five minutes to complete and they were not shown the brochures or the letter sheet before deciding. As such, it is unlikely most participants did not choose the letter because they thought it would take more time; however, this is a variable that would certainly be worth manipulating in future studies as a way to vary resistance among reduction options. It is my contention that the letter writing task was seen as particularly effortful (or what Festinger might call resistant to change) when compared to the three information pamphlets and that this is largely why most participants did not choose it.

Interestingly, the two reduction strategies that were preferred the most by participants in Experiment 1 (i.e., justification through expense and denial of

responsibility) and Experiment 2 (i.e., issue confrontation and justification through expense) are considered direct strategies, and Stone and colleagues (1997) have shown that direct strategies are the preferred mode of dissonance reduction following an act of hypocrisy. Direct strategies reduce dissonance by focusing on altering a cognition central to the discrepant act (e.g., changing one's attitude, deciding the issue is not important, perceiving the issue in a new way, suggesting the discrepancy is not a fault of one's own behaviour). Conversely, indirect strategies allow for dissonance reduction without changing anything among the dissonant cognitions (e.g., becoming distracted or misattributing the source of the dissonance to something else) (Stone et al., 1997).

Dissonance resulting from hypocrisy is thought to motivate people to deal directly with the discrepant act as a means of maintaining consistent views of oneself. Indeed Stone et al. (1997) found that after a hypocritical act, participants preferred the direct over the indirect strategy. Results from both of the present experiments lend some support to this finding. The indirect strategy, distraction, was rated next to last in terms of preference in both experiments (even though in both studies it was the most effective at actually reducing dissonance). However, distraction was still preferred over the letter writing task in Experiment 1 (a direct strategy) and it was preferred over the denial of responsibility option in Experiment 2 (also a direct strategy). In the study by Stone and colleagues (1997) the two reduction strategies were more equivalent in terms of the effort required, asking participants to either donate to a charity or to buy condoms at a reduced price. Perhaps as the effort required for a strategy increases (e.g., as in writing a letter of support versus reading something), it becomes a less preferable option even if it does address the cognitive discrepancy directly such that an indirect strategy becomes the

preferable choice. The results from Experiment 2 help support this assertion. Once the reading options from Experiment 1 were turned into writing tasks, the preference for writing in support of cage-free eggs increased dramatically (from 8% in Experiment 1 to 43% in Experiment 2). That is, once the amount of effort required to complete the different reduction strategies was made equivalent, participants were no longer reluctant to choose the direct strategy of writing in support of cage-free eggs.

To further the comparison of direct to indirect strategies another result from Experiment 2 should be described in detail. Participants in Experiment 2 preferred the indirect distraction option over the direct option of denial of responsibility. In this case participants may have chosen the distraction option more often (i.e., writing about participating in psychology studies) because they felt more capable of writing about it than writing about the role farmers play in the production of battery-caged chickens. So again, it may be that direct reduction strategies are preferable to indirect strategies but only when both strategies are equivalent in terms of the effort required to execute them. If one strategy seems to require more effort, time, or knowledge, then perhaps the other, less effortful, strategy, whether it is direct or indirect, becomes the preferred option. This possibility deserves more attention, especially as social psychologists become excited about the possibility of hypocrisy interventions motivating behaviour change (Stone & Fernandez, 2008). If the direct behavioural reduction strategies made available to participants after a hypocrisy induction are presented in isolation (Fried, 1998; Fried & Aronson, 1995) or alongside reduction strategies that do not vary in their resistance to change (i.e., not presenting strategies that people find both easy and difficult to use) we will likely end up with an inaccurate picture of dissonance reduction.

In an attempt to further explain dissonance reduction preferences, I assessed whether the magnitude of dissonance was related to preference ratings of the different reduction options. Leippe and Eisenstadt (1999) have proposed a continuum in which dissonance reduction modes can be placed according to the amount of elaboration required. If one is experiencing minimal dissonance then simply forgetting about the cognitive discrepancy may be sufficient to reduce dissonance, but as the level of dissonance goes up so too does one's motivation to reduce it. Hence, when experiencing higher levels of dissonance one may be more motivated to engage in reduction modes that require more elaboration or effort (e.g., attitude change). Although no relationship was found between dissonance magnitude and the preference ratings of the different options (simple distraction vs. justification or denial of responsibility vs. writing the letter) there was a relationship between attitude importance and reduction options. Participants with high attitude importance were more likely to choose the letter writing option in Experiment 1 than participants with low attitude importance. This finding coincides with the suggestion of Leippe and Eisenstadt (1999) that as attitude importance increases one will be more likely to prefer a more elaborate dissonance reduction mode, such as engaging in an effortful behaviour. Furthermore, in Experiment 2 participants with high attitude importance were less likely to deny responsibility as a means of dissonance reduction when compared to participants low in attitude importance. Importance of the dissonant cognitions is a variable that should be explored further in order to unearth exactly how this factor may play a role in the choice of various reduction strategies.

Lastly, in Experiment 1 *shame* significantly predicted participants' decision to write the cage-free egg campaign support letter.¹⁰ This result follows other literature that has identified guilt as a moral emotion that has the power to result in prosocial behaviour (Haidt, 2003; Hooge, Nelissen, Breugelmans, & Zeelenberg, 2011; Izard, 1977). Guilt motivates people to make reparations for the wrong they have committed, and perhaps that is what happened with some participants in Experiment 1. Stone and Fernandez (2008) have argued that dissonance resulting from hypocrisy motivates people to change their behaviour, rather than engage in another form of dissonance reduction, because after advocating a particular behaviour people are motivated to restore their self-integrity. This is most readily accomplished by having one's behaviour match the position one advocates (Stone & Fernandez, 2008). Perhaps guilt, more so than a general feeling of discomfort, predisposes one to action such that behaviour change does become more likely after realizing one's hypocritical stance. Research reviewed by Carver and Scheier (2008) might also suggest that this is the case because certain negative emotions (e.g., frustration and anger) tend to result in increases in effort, whereas other negative emotions (e.g. sadness, hopelessness) are associated with decreased levels of effort. If guilt is more akin to the motivating forces of anger and frustration then this would further support the contention that individuals experiencing guilt are primed for action, to make behavioural reparations for the act they committed.

Ultimately, to further our understanding of dissonance reduction, we need to shift the focus from the early consideration of order of presentation to the different factors that make particular reduction strategy selections more or less likely. Mapping out the variety

¹⁰ The shame subscale was composed of three items: shame, embarrassment, and guilt. Authors have spent considerable energy making distinctions among these emotions and for more information on this topic see Cohen, Wolf, Panter, and Insko (2011) and Smith, Webster, Parrott, and Eyre (2002).

of reduction strategies that exist, considering the factors that influence the preference of strategies along the lines of Festinger's resistance to change concept, and comparing strategies simultaneously will expand both our theoretical and practical understanding of dissonance reduction.

The Role of Self-esteem in Cognitive Dissonance

Questions about the role that self-esteem plays in cognitive dissonance were initially sparked by revisions to cognitive dissonance theory that placed a greater emphasis on the role of the self relative to inconsistency between cognitions. According to Aronson's (1969) self-consistency theory of cognitive dissonance, individuals with high self-esteem should be particularly affected by instances of cognitive dissonance because their hypocritical actions should be at odds with their positive self views. So people with high self-esteem should experience more dissonance than those with low self-esteem. In later writings Aronson (1999) has suggested that the relationship between self-esteem and dissonance arousal may be more complex because he views self-esteem as a bi-dimensional construct; it can be either high or low and fragile or well-grounded. He proposes that people with high but fragile self-esteem are obsessed with being right and will therefore justify their actions quickly and frequently whereas people with high and well-grounded self-esteem are better able to notice their shortcomings and learn from them. He does not go on to articulate how this conceptualization of self-esteem would interact with dissonant experiences, and he notes that much of his thinking about self-esteem and dissonance amounts to speculation that requires empirical testing.

Not a great deal of experimental work on cognitive dissonance has included self-esteem as a main variable. Yet research on self-affirmation theory (Steele et al., 1993),

self-justification strategies (Holland et al., 2002), and the self-esteem predictions derived from self-affirmation theory and self-consistency theory (Nail, Misak, & Davis, 2004) has documented self-esteem effects similar to those found in the present experiments. Taken together, the results suggest that self-esteem acts as a buffer to dissonant experiences, which is the prediction made under Steele's (1988) self-affirmation theory. In the present work a negative relationship between high self-esteem and dissonance was observed in both Experiments 1 and 2. Once again it seems that self-esteem served a protective function for individuals undergoing a state of cognitive discrepancy. However, self-esteem might not always serve this role in the process of dissonance arousal. Holland and colleagues (2003) argued that the self-relevance of the dissonant act is an important variable in the activation of self-esteem as a buffer to dissonance. In both their study and in my experiments the cognitive discrepancy produced was related to the self (i.e., prejudice and hypocrisy, respectively). When dissonance is induced without implicating the self, as in the free choice paradigm where one chooses between two equally desirable objects, the affirmation resources available to high self-esteem individuals should not be drawn on to ward off dissonance as the discrepancy has little to do with aspects of the individual. Importantly though, many dissonance-inducing procedures (e.g., effort justification, counterattitudinal advocacy, hypocrisy) do implicate the self and as such self-esteem may moderate the effects found in such experiments. Ultimately, if high self-esteem individuals can rely on their positive self views to mitigate the effects of cognitive discrepancy, they may differ in their preferences for dissonance reduction strategies when compared to people with low self-esteem. They may not only use reduction strategies less (as found in the abovementioned studies) but they may also elect to use different

strategies when compared to low self-esteem individuals. Although this relationship is speculative, it may be useful to consider self-esteem as a moderating variable in cognitive dissonance studies focused on the modes of dissonance reduction.

Applications

Inducing cognitive dissonance, through hypocrisy, has been applied successfully to a range of domains from eco-friendly behaviours such as water conservation (Dickerson et al., 1992), and recycling (Fried & Aronson, 1995), to health behaviours such as safer sex practices (Stone, et al., 1994), and the use of sunscreen (Fernandez et al., 2007). Importantly, many of these studies have provided a behaviour change option to participants thereby making it easier for them to act. Given the results from Experiment 1, where only 8% chose the effortful behaviour change option, it may be particularly important to present behaviour change opportunities to people once dissonance is induced if the hope is to change behaviour in a prosocial manner. Otherwise, individuals may fall back on less effortful reduction strategies that allow them to justify their behaviour. But ultimately, if one does not care about an issue it may be difficult to motivate behaviour change through dissonance induction because the initial arousal of dissonance should depend on one's level of attitude importance. In these instances, more dramatic presentations of information (e.g., through shocking or otherwise engaging visuals) may elicit emotional reactions that would otherwise be absent. And then, following from the literature on fear appeals (Ruiter, Abraham, & Kok, 2001) it would be important to present behaviour change opportunities immediately following successful dissonance induction.

Cognitive dissonance can be a motivating force that leads to behaviour change. People have changed their diets once recognizing the discrepancy between their attitudes (e.g., all animals should be treated well) and behaviour (e.g., I consume products from animals that were likely not treated well) (Hjelmar, 2011). Some individuals stop eating animal products completely whereas others become more selective about the animal products they buy by looking for products that were produced organically or through free-range farming. But much stands in the way of changing behaviour. There are many legitimate reasons why individuals might not change their consumption habits (e.g., expense, availability, lack of knowledge, convenience) and it can be difficult to connect to dissonance when animal products all appear similar (i.e., free-range eggs look no different from battery-caged eggs, at least on the outside). But as one learns more about ethical food consumption and decides it is a personally important issue, repeated instances of dissonance, or times of feeling like a hypocrite, may push a person to resolve dissonance directly through behaviour change.

Lastly, besides using the hypocrisy procedure, or something similar, as an intervention to spur behaviour change, researchers might want to consider providing people with information about cognitive dissonance and the multitude of ways that humans rationalize choices and actions. Alerting people to the process of cognitive dissonance could help them connect with why they are experiencing dissonance and reflect on that experience and potentially learn from it. For example, if an individual wants to exercise daily but finds himself coming up with reasons to not exercise he could perceive these excuses for what they are, rationalizations/modes of dissonance reduction, if he knew about cognitive dissonance. Recognizing one's litany of behaviour

justifications could be the first step in minimizing rationalizations and instead moving towards behavioural change.

Limitations and Future Directions

The results from the present experiments have begun to address some aspects of cognitive dissonance theory that require more research attention. Yet there is room for improvement in terms of how these experiments were conducted. Firstly, the experimenters were not blind to condition. The procedure for these experiments required considerable communication between the researcher and the participant, and when the mindfulness manipulation was introduced to participants in the hypocrisy conditions (i.e., how many eggs have you eaten recently?) the researcher explained that the coordinator from the Chicken Out Program requested this information. As such, the researcher knew whether the participant was in the control or hypocrisy condition. Previous studies using the hypocrisy procedure have kept the experimenter blind up until the point of the mindfulness manipulation (Fried, 1998). Conceivably this could have been accomplished in the current experiments. Furthermore, written instructions could explain to participants why they need to complete the mindfulness questionnaire or conversely the word search filler task, which would thereby keep the experimenter blind to condition throughout the study. However, this would not be possible in the hypocrisy plus condition as the researcher needs to show the video to participants. Another experimenter could be responsible for the video manipulation, thereby leaving the other experimenter blind to condition, but this complicates the logistics of running the study.

Another area for procedural improvement concerns minimizing potential demand characteristics when participants are choosing a dissonance reduction mode. In these

experiments the researcher remained in the room while participants chose which option they wanted to complete. Therefore participants may have felt pressure to choose an option that would please the researcher (i.e., writing the support letter or writing about what they can do to support cage-free egg practices), although this did not seem to be a problem in Experiment 1 as so few participants chose the letter option. Demand characteristics were minimized in the experiments by having the researcher seated in another location in the room working at a computer, presumably uninterested in the option chosen by participants. However, other researchers have improved upon this procedure by actually having the experimenter leave the room while participants decide which choice to make (Fried & Aronson, 1995; Stone et al., 1997). Future studies that offer multiple dissonance reduction strategies to participants should employ this technique to truly minimize demand characteristics.

The hypocrisy procedure could also be improved by controlling the amount of time participants spend on preparing their video speech and on their writing tasks. Participants were allowed as much time as they wanted to complete these tasks and while most participants took five minutes or less to compose their speech, procedural rigor would be increased by limiting all participants to a certain amount of time to write their speech. A more important concern is the amount of time participants took to complete the reduction task. It is possible that the longer participants spent reading the pamphlets or writing the more dissonance went down. I tried to control for this possibility by creating pamphlets that were almost equal in word length and by providing participants with sheets of paper to write on that had the same number of lines. In future studies the

experimenter may also want to record the amount of time it takes individual participants to complete such tasks and then statistically control for this variable in analyses.

It is difficult to interpret the differences in findings between experiments 1 and 2 because in addition to differences between the samples, there were several design and procedural differences between the experiments. In Experiment 2 the video was included in one condition and the reduction options were changed. So although the writing task in support of cage-free eggs was chosen more often in Experiment 2 it is difficult to say whether this is due to the inclusion of the video, the changes made to the options, or a combination of these factors. Studies that create conditions in which these variables are controlled for would help clarify their effects.

Additionally, the sample differences raise the broader question of the generalizability of these findings. A non-random, convenience sample was used and the extent to which these findings would generalize to other people, places, and times remains an unanswered question. Although Festinger posited that higher attitude importance results in higher levels of dissonance, the mixed findings from these experiments suggest this proposition requires further study, perhaps alongside variables such as attitude salience (Starzyk et al., 2009) and self-esteem. Cooper (2007) reviewed how some different variables (e.g., cultural norms, race, and SES) can affect the arousal of dissonance and in a discussion of the generalizability of dissonance findings, concluded that ultimately dissonance is experienced by everyone (p. 156). Yet, he is silent on the process of dissonance reduction and how this might vary across different samples of people. As research on dissonance reduction develops it will be important to keep questions of generalizability in mind. For example, in Experiment 2 women felt

more dissonance and generally reported that the treatment of battery-caged chickens was more important to them when compared to the results from men in the sample. These effects may carry over and influence selection of reduction modes. When conducting future research, experimenters may want to ensure that attitude importance among male and female participants is equivalent or otherwise account for this. Similarly, if researchers choose topics that may be of greater importance to older participants than younger participants this should also be accounted for.

A final limitation to mention is that in these experiments participants did not report very high levels of dissonance. In Experiment 1 the means on the subscales ranged from 2.01 to 2.67, where 7 is the high-point of the scale indicating extreme levels of dissonance. In the hypocrisy plus condition in Experiment 2 means on all the subscales were higher, but still lower than the mid-point of the scale (means from 2.69 to 3.39). While these means are on par with the means reported in other studies (Elliot & Devine, 1994; Holland et al., 2002), dissonance researchers should continue to investigate other means of arousing dissonance or alterations to current procedures that may heighten one's experience of dissonance. Certainly, it is not desirable to have participants feel awful when completing a psychology study, but when investigating the motivational properties of an aversive affective state researchers have to consider how findings with means considerably under the mid-point of the dissonance thermometer affect the validity of their results.

One of the main goals of this research was to explore the preferences people display when reducing cognitive dissonance. From these results it seems that continuing this research while considering the variables of attitude importance and self-esteem

would be worthwhile. Some researchers (e.g., Holland et al., 2002; Leippe & Eisenstadt, 1999; Stone et al., 1997) have begun to map out a taxonomy of reduction strategies and the circumstances that might lead to certain strategies being used over others. As researchers continue to explore dissonance reduction strategies it will be important to consider how these strategies are both operationalized and presented in the lab. Strategies can vary in their pleasantness, the degree of effort and time required to complete them, the level of knowledge required to complete them, in their accessibility, and no doubt on a long list of other factors. Basically, as Festinger (1957) wrote - cognitions vary in their resistance to change. Exploring this construct more as we focus on dissonance reduction may create some organization around the many dissonance reduction modes that are available to people experiencing that familiar state of psychological discomfort.

Interest in cognitive dissonance theory has waxed and waned in social psychology over the past 50 years. Yet the theory has shown tremendous staying power. Questions remain about the exact reason for the motivational properties of dissonance (i.e., why exactly are cognitive discrepancies motivating?), and as I have argued much work lies ahead in order to understand the ways and preferences individuals have for reducing dissonance. This issue of dissonance reduction deserves further attention as it can help explain why individuals act in accordance with their attitudes or why we find ourselves repeating the same rationalizations day after day.

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Appendix A:
Graph of Dissonance Reduction (Hardyck & Kardush, 1968)

688 THEORIES OF COGNITIVE CONSISTENCY

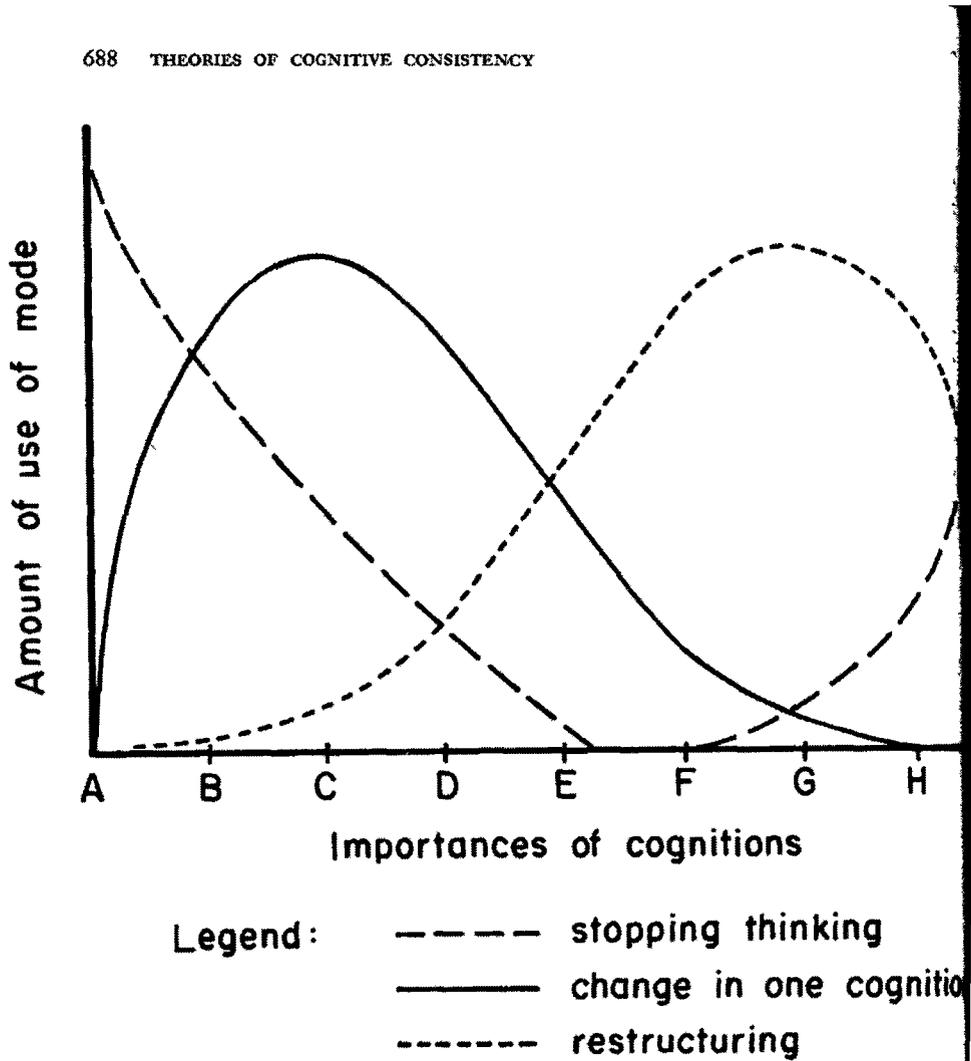


FIGURE. The model for prediction of mode of dissonance-reduction as a function of the importance of the two cognitions. (Both axes are arbitrarily scaled)

Appendix B:
Measures

Dissonance Thermometer (Elliot & Devine, 1994)

The dissonance thermometer was developed by Elliot and Devine (1994) and is a self-report measure of one's experience of cognitive dissonance. Participants record their affective state by responding to a list of adjectives. The dissonance thermometer offers a convenient and valid way to assess cognitive dissonance in the laboratory. Items 1 through 3 represent the emotions pertaining to discomfort; items 4 through 7 represent a negative self index; items 8 through 10 represent a shame index; and items 11 to 14 represent a positive affect index. The guilt item was added to the scale in Experiment 2. The order of the items was changed in the actual presentation of the scale.

Please indicate how you are feeling right now by circling a number from 1 (*does not apply at all*) to 7 (*applies very much*).

1. Uncomfortable
2. Uneasy
3. Bothered
4. Disappointed with myself
5. Annoyed with myself
6. Disgusted with myself
7. Angry at myself
8. Shame
9. Embarrassed
10. Guilty
11. Good
12. Happy
13. Optimistic
14. Friendly
15. Energetic

Attitude Importance Scale from Pre-testing

1. I do not care about the issue of cruel farm practices toward egg-laying chickens.

1.....2.....3.....4.....5.....6.....7
 strongly neither strongly
 disagree agree or disagree agree

2. I am interested in the issue of egg production from humanely raised chickens.

1.....2.....3.....4.....5.....6.....7
 strongly neither strongly
 disagree agree or disagree agree

3. The treatment of egg-laying chickens is a topic worthy of discussion.

1.....2.....3.....4.....5.....6.....7
 strongly neither strongly
 disagree agree or disagree agree

4. How personally important is the ethical treatment of egg-laying chickens to you?

1.....2.....3.....4.....5.....6.....7
 not at all neither extremely
 important important

5. How personally important is the issue of cruelly raised egg-laying chickens to you?

1.....2.....3.....4.....5.....6.....7
 not at all neither extremely
 important important

Preference for Consistency Scale (Cialdini, Trost, & Newsom, 1995)

The internal consistency scores for this scale in Experiments 1 and 2 were .86 and .84, respectively.

Please indicate to what extent you agree or disagree with each of the following statements using the following scale:

Disagree strongly = 1

Disagree a little = 2

Neither agree nor disagree = 3

Agree a little = 4

Agree Strongly = 5

1. I prefer to be around people whose reactions I can anticipate.
2. It is important to me that my actions are consistent with my beliefs.
3. Even if my attitudes and actions seemed consistent with one another to me, it would bother me if they did not seem consistent in the eyes of others.
4. It is important to me that those who know me can predict what I will do.
5. I want to be described by others as a stable, predictable person.
6. Admirable people are consistent and predictable.
7. The appearance of consistency is an important part of the image I present to the world.
8. It bothers me when someone I depend upon is unpredictable.
9. I don't like to appear as if I am inconsistent.
10. I get uncomfortable when I find my behavior contradicts my beliefs.
11. An important requirement for any friend of mine is personal consistency.
12. I typically prefer to do things the same way.
13. I dislike people who are constantly changing their opinions.
14. I want my close friends to be predictable.
15. It is important to me that others view me as a stable person.
16. I make an effort to appear consistent to others.
17. I'm uncomfortable holding two beliefs that are inconsistent.
18. It doesn't bother me much if my actions are inconsistent.

Self-esteem scale Rosenberg (1965)

The internal consistency scores for this scale in Experiments 1 and 2 were .89 and .88, respectively.

Please indicate whether you strongly agree, agree, disagree, or strongly disagree with the following statements.

1. On the whole I am satisfied with myself.
2. At times I think that I am no good at all.
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I certainly feel useless at times.
7. I feel that I am a person of worth, at least the equal of others.
8. I wish I could have more respect for myself.
9. All in all, I am inclined to feel that I am a failure.
10. I take a positive attitude toward myself.

Ten-Item Personality Inventory (TIPI) (Gosling, Renfrow, & Swan, 2003)

In Experiment 1, the internal consistency scores for the subscales of the inventory were: Extraversion = .76; Agreeableness = .35; Conscientiousness = .46; Emotional Stability = .60; Openness = .47.

In Experiment 2, the internal consistency scores for the subscales of the inventory were: Extraversion = .78; Agreeableness = .30; Conscientiousness = .61; Emotional Stability = .62; Openness = .65.

Please write a number 1 (*strongly disagree*) to 7 (*strongly agree*) next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

I see myself as:

1. _____ Extraverted, enthusiastic.
2. _____ Critical, quarrelsome.
3. _____ Dependable, self-disciplined.
4. _____ Anxious, easily upset.
5. _____ Open to new experiences, complex.
6. _____ Reserved, quiet.
7. _____ Sympathetic, warm.
8. _____ Disorganized, careless.
9. _____ Calm, emotionally stable.
10. _____ Conventional, uncreative.

Self-monitoring Scale (Snyder, 1974)

The internal consistency scores for this scale in Experiments 1 and 2 were .64 and .50, respectively.

The statements below concern your personal reactions to a number of different situations. No two statements are exactly alike, so consider each statement carefully before answering. IF a statement is TRUE or MOSTLY TRUE as applied to you, circle the "T" next to the question. If a statement is FALSE or NOT USUALLY TRUE as applied to you, circle the "F" next to the question.

- (T) (F) 1. I find it hard to imitate the behavior of other people.
- (T) (F) 2. My behavior is usually an expression of my true inner feelings, attitudes, and beliefs.
- (T) (F) 3. At parties and social gatherings, I do not attempt to do or say things that others will like.
- (T) (F) 4. I can only argue for ideas which I already believe.
- (T) (F) 5. I can make impromptu speeches even on topics about which I have almost no information.
- (T) (F) 6. I guess I put on a show to impress or entertain people.
- (T) (F) 7. When I am uncertain how to act in a social situation, I look to the behavior of others for cues.
- (T) (F) 8. I would probably make a good actor.
- (T) (F) 9. I rarely seek the advice of my friends to choose movies, books, or music.
- (T) (F) 10. I sometimes appear to others to be experiencing deeper emotions than I actually am.
- (T) (F) 11. I laugh more when I watch a comedy with others than when alone.
- (T) (F) 12. In groups of people, I am rarely the center of attention.
- (T) (F) 13. In different situations and with different people, I often act like very different persons.
- (T) (F) 14. I am not particularly good at making other people like me.
- (T) (F) 15. Even if I am not enjoying myself, I often pretend to be having a good time.
- (T) (F) 16. I'm not always the person I appear to be.
- (T) (F) 17. I would not change my opinions (or the way I do things) in order to please someone else or win their favor.
- (T) (F) 18. I have considered being an entertainer.
- (T) (F) 19. In order to get along and be liked, I tend to be what people expect me to be rather than anything else.
- (T) (F) 20. I have never been good at games like charades or improvisational acting.
- (T) (F) 21. I have trouble changing my behavior to suit different people and different situations.
- (T) (F) 22. At a party, I let others keep the jokes and stories going.
- (T) (F) 23. I feel a bit awkward in company and do not show up quite as well as I should.
- (T) (F) 24. I can look anyone in the eye and tell a lie with a straight face (if for a right end).

(T) (F) 25. I may deceive people by being friendly when I really dislike them.

Appendix C:
Consent and Debriefing Forms

Informed Consent Form

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Study Title: Chicken Out Campaign Project

Faculty Sponsor: Dr. Bernadette Campbell Tel.520-2600 x4080 Email:
bernadette_campbell@carleton.ca

Principle Investigator: April McGrath Tel. 520-2600 x1587 Email:
amcgrath@connect.carleton.ca

If you have any ethical concerns about how this study is conducted, please contact Dr. Monique Sénéchal (Chair of the Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 1155) or Dr. Janet Mantler (Acting Chair of the Department of Psychology at Carleton University, 520-2600, ext. 4173).

Purpose and Task requirements: The aim of the present study is to gather short videotaped speeches from students as support for the Chicken Out Project. We will be asking you to write a short paragraph on why the campaign is important and say this speech on tape in order to develop a video to be delivered to local junior high schools. You will also be asked to complete several questionnaires, and in total this should take 40 minutes.

Potential risk/discomfort. You will be provided with facts about chicken egg production, some of which are about the cruelty experienced by chickens and this may cause discomfort for some participants. Some people get nervous about being videotaped. Your short speech will be recorded, with your permission, and shown only to junior high school students in class as part of a larger project.

Right to withdraw and confidentiality. Your participation in this study is entirely voluntary. At any point during the study you have the right to not complete certain questions or to withdraw with no penalty whatsoever. You will still receive participation credit for your time. The data collected in this experiment are confidential. All data are coded such that your name is not associated with the data. The coded data are made available only to the researchers associated with this project.

I have read the above description of the study entitled “Chicken Out Campaign Project.” The data collected will be used in research publications and/or for teaching purposes. My signature indicates that I agree to participate in the study, be videotaped for educational purposes, and this in no way constitutes a waiver of my rights.

Full Name (please print): _____

Participant Signature: _____

Date: _____

Researcher Signature: _____

Date: _____

Debriefing Form

This post-session information is designed to help you understand the exact nature of the research. The research described to you earlier about the Chicken Out Project is important but this description did not provide you with the complete purpose of this study. What I could not tell you at that time is that I am interested in determining if people experience discomfort when they advocate one position but recall times in which their behaviour did not reflect their stated position. This discomfort is known as cognitive dissonance within psychology and is simply the feelings experienced by a person when confronted with two thoughts, or a thought and behaviour, that do not go together. For example, a person who values her health but smokes may experience dissonance. I was unable to disclose this part of my interest in order to maintain methodological rigor, and in order not to place pressure on you to react one way or another in this study. That is, if you had known at the beginning of the study that I am interested in how people reduce the discomfort aroused from acting inconsistently with their attitudes you may have responded in a certain manner simply because of this information. Therefore, it was necessary for you not to know that you were recruited for this study because of your attitudes about the welfare of chickens, and an alternate study description (i.e., supporting the Chicken Out Project) was given to you. And while deception was used in this research study, it is not used in most psychological research.

Understanding more about the process of cognitive dissonance is important because we currently know very little about how people deal with situations that arouse this particular type of discomfort. For example, some smokers resolve their anxiety about smoking by quitting, while others find reasons to justify their behaviour. We need to learn more about why some people choose the behavioural path to reducing their anxiety (e.g., quitting smoking) while others are satisfied by justifying their behaviour. Your responses in this study will help us determine whether certain factors (e.g., attitude importance) influence how people decide to reduce their feelings of dissonance.

With this in mind, consider what happened in this study. During the study you completed a video stating your support for the Chicken Out Project. Everyone in the study did this but then depending on which group you were placed in you either remembered times you did not buy cage-free eggs or simply completed a word puzzle. Participants who remembered times they did not buy cage-free eggs will experience dissonance because they said one thing, "Buying cage-free eggs is important", but then admitted they do not

always follow this advice. I then gave all participants a mood questionnaire to complete that I said was required by the ethics committee, but in reality is a measure of cognitive dissonance. Following this, you were presented with four options as a way to complete your time in the lab and chose one of the options to complete. These options represent the ways in which participants can reduce their dissonance: by denying responsibility, justifying your behaviour, becoming distracted by reading new information, or by participating in a behaviour that helps the Chicken Out Project. After completing one of these options we again measured your level of dissonance as well as a number of other factors that are thought to influence the process of cognitive dissonance (e.g., personality variables, self-esteem). The video we recorded will not actually be used for an education campaign and your recording will be erased immediately.

Based on dissonance research I expect that people who think the issue of chicken welfare is very important will experience more cognitive dissonance than people who think the issue is less important. Furthermore, people who experience higher levels of dissonance should be more motivated to reduce their feelings of dissonance and may be more likely to choose the behavioural option to accomplish this task.

In sum, this study was designed to improve our understanding of how people deal with the discomfort aroused by cognitive dissonance. We would like to thank you for participating in this research. Your time and efforts are greatly appreciated! Without the participation of people like you important questions in psychology could not be answered. If you have any questions or comments about this research, then please feel free to contact Dr. Bernadette Campbell (520-2600 ext: 4080, bernadette_campbell@carleton.ca). If you have any ethical concerns about this study please contact Dr. Monique Sénéchal (Chair of the Carleton University Research Ethics Committee for Psychological Research, 520-2600, ext. 1155) or Dr. Janet Mantler (Chair of the Department of Psychology at Carleton University, 520-2600, ext. 4173).

Lastly, know that you do have the right to withdraw your data. That is, if you do not want your data used, tell the experimenter that you would like your data withdrawn. If you choose to withdraw your data, all information that you have provided will be destroyed. On the following page is a consent form to use your data. That is, because you were only told of the procedures and not the purpose of this study at the outset, we now ask you for your permission to use your data for research and teaching purposes. Know however, that signing the attached sheet does *not* preclude you from requesting that your data be eliminated at a later date.

Informed Consent to the Use of Data

The purpose of an informed consent is to ensure that you now understand the true purpose of the study and that you agree to allow your data to be used for research and teaching purposes. Because you were only told of the procedures and not the purpose of this study at the outset, we are now asking for your consent to allow your data to be used for research and teaching purposes.

Purpose. The purpose of this study is to determine how attitude importance relates to cognitive dissonance and how people reduce their feelings of cognitive dissonance.

Anonymity/Confidentiality. The data collected in this study are kept confidential. The consent forms are kept separate from your responses.

Right to withdraw data. You have the right to indicate that you do not wish your data to be used in this study. If you indicate this is your choice, then all measures you have provided will be destroyed.

Signatures: I have read the above description of the study concerning written feedback. The data in the study will be used in research publications or for teaching purposes. My signature indicates that I agree to allow the data I have provided to be used for these purposes.

Full Name (Print): _____
Participant Signature: _____
Date: _____
Researcher Signature: _____
Date: _____

Appendix D:
Study 1: Correlations, Descriptives, Data Screening

Table 15
Study 1: Correlations, Means, and Standard Deviations among Variables

	11	12	13	14	15	16	17	18	19	20	<i>M</i>	<i>SD</i>
	.17**	.07	.08	.04	-.10	.01	-.03	.39**	.04	.19**	4.43	1.38
	-.08	.06	.06	.02	-.14	.01	-.08	.10	-.05	.28**	.23	.99
	.02	-.07	-.03	-.18**	.02	.08	.00	.06	-.06	.06	1.84	1.17
	.03	-.08	-.10	-.17**	-.02	.11	.13	.07	-.03	.00	1.61	.98
	-.01	-.09	.00	-.19**	.05	.07	.08	.06	-.08	.06	2.16	1.20
	.18*	.13	.06	.25**	-.07	-.04	-.02	.00	.10	.17*	4.93	1.31
	.10	.12	.17*	.35**	-.07	.11	-.05	-.14	.06	-.04	2.74	.52
	.24**	-.17**	-.13*	-.10	.09	.03	.10	.08	-.02	-.23**	12.40	3.78
	-.25**	-.06	.18*	-.29**	.04	-.02	.17*	.08	.12	.22**	3.41	.57
	.38**	.13	.03	.20**	-.05	.10	.06	.06	-.09	-.16*	4.58	1.44
	-	.33**	.13*	.22**	-.18*	.13	.21*	.15	-.07	-.02	5.40	1.18
		-	.29**	.29**	-.19*	-.10	.00	.07	.19*	.18**	5.10	1.12
			-	.18**	-.01	.05	.04	-.12	.00	.08	5.41	1.22
				-	-.10	.07	.06	.00	.11	.08	4.95	1.29
					-	.04	-.06	-.19*	-.10	.10	1.91	1.48
						-	.24**	-.19*	-.22**	-.14	5.36	1.54
							-	.01	.00	-.14	4.83	1.65
								-	.10	.14	3.23	1.75
									-	.05	4.05	1.83
										-	20.43	5.93

Measure	1	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Impt	-	.06	.16*	.16*	.15*	.09	-.04	.18**	-.02	-.05
2. Egg		-	.02	.07	.13	.04	-.02	-.10	.07	-.02
3. Shame			-	.87**	.77**	-.39**	-.21**	.04	.02	-.08
4. Neg				-	.75**	-.42**	-.16*	.03	-.01	-.06
5. Dis					-	-.50**	-.17*	-.02	.00	-.09
6. Pos						-	.05	.10	-.01	.33**
7. SE							-	-.16	-.10	.18*
8. SM								-	-.07	.31**
9. CC									-	-.14
10. Extra										-
11. Open										
12. Agree										
13. Con										
14. Emot										
15. Free										
16. Expense										
17. Resp										
18. Letter										
19. Distr										
20. Age										

Note. Impt = Importance; Egg = Proportion of consumed eggs that were cage free; Shame = Shame overall; Neg = Negative Self overall; Dis = Discomfort overall; Pos = Positive affect overall; SE = Self-esteem; SM = Self-Monitoring; CC = Cognitive consistency; Extra = Extraversion; Open = Openness; Agree = Agreeableness; Con = Conscientiousness; Emot = Emotional stability; Free = Perceived freedom; Expense = Rating of expense option; Resp = Rating of responsibility option; Letter = Rating of letter option; Distr = Rating of distraction option. * $p < .05$; ** $p < .01$.

Data Screening

Data entry errors were identified by checking for out of range values for all variables. Problematic values were corrected by identifying the relevant case and replacing the out of range value with the proper score.

Missing Data Analysis

An initial check for missing data was conducted by examining the frequency tables for each variable. Tabachnick and Fidell (2007, p. 63) note that if less than 5% of the data is missing completely at random then there are no serious problems to address in terms of the missing data. When examining the ungrouped data, only one variable, the preference rating for the letter option, had missing values slightly exceeding 5%, at 5.3%. A missing value analysis revealed that missing data were missing completely at random with a Little's MCAR test value of $\chi^2(56, N = 150) = 53.55, p = .57$. Similarly, when the data was grouped according to condition and attitude importance level all test values for Little's MCAR indicated the data was missing completely at random ($ps > .10$).

Outliers

Univariate outliers were determined by examining z-scores for values that exceeded ± 3.29 (Tabachnick & Fidell, 2007, p. 73). For participants in the experimental group with high attitude importance, no value exceeding 3.29 among the continuous variables was found (range from -2.82 to 2.71). In the other three cells a total of seven univariate outliers were found (ranging from 3.34 to 4.45). To maintain interpretability score alteration of outliers was chosen over variable transformations. Each outlier was brought within .25 to 1.00 units of the next largest score in the distribution (Tabachnick

& Fidell, 2007, p. 77) and as such still remained the most deviant score but while minimizing its overall influence. The primary MANOVA analysis was conducted before and after the outlier alteration. The score alterations had a minimal impact on the significance outcomes of the MANOVA (e.g., the largest change was that the main effect of condition went from an initial level of significance of $p = 0.048$ to $p = 0.040$).

Screening for multivariate outliers was conducted with Mahalanobis Distance statistics. Statistics for all four cells indicated that no significant multivariate outliers were present in the data. All cases had a Mahalanobis distance less than $\chi^2(19) = 43.82$ (the range of Mahalanobis distances across all four cells were 7.37 – 35.99).

Normality of Data

An overview of the normality of the data was conducted by creating histograms with normal curves. Skewness and kurtosis were assessed numerically by producing values for each of these measures on all continuous independent and dependent variables. The variables were examined by grouping the data according to condition and attitude importance. Six of the primary dependent variables (i.e., negative self, shame, and unease at both times 1 and 2) displayed non-normality. Histograms for these variables revealed positively skewed distributions as did skewness scores in the range of 1.11 to 1.83. Transformations (i.e., square root, logarithm, and inverse) were performed in an attempt to normalize the data. Although improvement was made in terms of skewness scores (with a range of .29 to 1.17 for the logarithm transformation) inspection of the histograms for all transformations revealed that the data was still positively skewed (except in the case of the inverse transformation, which resulted in negatively skewed distributions). Tabachnick and Fidell (2007, p. 87) have noted that when variables are all moderately

skewed in the same fashion transformations offer marginal improvements in terms of analysis. Furthermore, “multivariate normality can be violated to a significant degree without seriously affecting the validity of the p values or the powers of the tests” (O’Brien, Kaiser, 1985, p. 331). As such, the data was left untransformed for ease of interpretation.

Homogeneity of Variance-Covariance Matrices

One of the assumptions underlying the use of MANOVA is that the cells in the design have equal variance-covariance matrices. This assumption was assessed with a Box’s M test. A significant result on this test, Box’s $M = 218.05$, $p < .001$, indicated this assumption had been violated. Follow-up analysis of the determinants for all cells revealed that the cell with the smallest sample size ($n = 27$) had the largest determinant, making significance tests liberal. Box’s M is not robust to departures from normality, unlike the main procedure of MANOVA (O’Brien & Kaiser, 1985, p. 331), and Tabachnick and Fidell (2007, p. 252) recommend disregarding the result of Box’s M test when cell sizes are equal as the robustness of the significance tests is expected. To correct for the significant Box’s M test the cell sizes were equalized to ensure a ratio not greater than 1:1.5 between the smallest and largest cell. This was accomplished by deleting four cases from the larger cells ($ns = 42$). Four cases were randomly deleted based on the numbers produced by a random number generator. This ensured that the sample sizes within the cells contained 27, 37, 40, and 40 cases each. Confidence in the results of the significance tests from the MANOVA can also be assured as transformations were performed on non-normal dependent variables. With square root transformations, the homogeneity of the variance-covariance matrices was no longer violated, Box’s $M =$

174.32, $p = .002$ (Box's M is considered significant at $p < .001$) (Tabachnick & Fidell, 2007, p. 252) and the results of the MANOVA did not change significantly. After the transformations the ps for attitude importance, condition, and the interaction between these variables were .005, .045, and .047, respectively. Without the transformations the values were .001, .038, and .025, respectively. Given these checks, the variables remained untransformed and the analysis proceeded with the equalized cell sizes.

Potential Covariate for MANOVA

A MANCOVA was considered for the main analysis as self-esteem was significantly correlated with all four dissonance thermometer subscales (see correlation table). Beyond this empirical basis, self-esteem was considered as a potential covariate because social psychologists have commented on its possible role in the experience of dissonance (Aronson, 1999; Steele & Liu, 1981; Stone & Cooper, 2001). Results from the MANCOVA indicated self-esteem was significantly correlated with the composite dissonance dependent variable, as indicated by a significant effect of self-esteem on dissonance, Wilk's Lambda = .84, $F(4, 136) = 6.30$, $p < .001$. However, to ensure that self-esteem was an appropriate covariate for the analysis, interactions among it and the other independent variables were examined to ensure homogeneity of regression. A significant interaction between time, attitude importance, and self-esteem ($p = .023$) indicated that this assumption was violated and that a MANCOVA with self-esteem as the covariate was an inappropriate analytic strategy. As such, the main analysis proceeded as a mixed model MANOVA and discussion regarding self-esteem will be limited to bivariate correlations.

Multicollinearity

Bivariate correlations were calculated for all variables to assess multicollinearity. Values for most variables fell well below the recommendation of .70 (e.g., the largest correlation was .40 between extraversion and openness) (Tabachnick & Fidell, 2007, p. 90). The repeated measures variables from the dissonance thermometer had correlations above .70 but this was expected and is not problematic (Tabachnick & Fidell, 2007, p. 89). However, correlations among the subscales of the dissonance thermometer were high in some cases (e.g., .83 between shame and self-directed negative affect). Although Tabachnick and Fidell (2007) warn that highly positively correlated dependent variables in a MANOVA could reduce power, others have suggested that the opposite may be true (Field, 2009, p. 586) and as such all three dissonance subscale variables were included in the MANOVA to form the composite dependent variable. Follow-up tolerance and variance inflation factor (VIF) values confirmed that multicollinearity was not a problem, with tolerance values above .1 and VIF values below 10 (Kutner, Nachtsheim, Neter, & Li, 2005, p. 409).

Assumptions of Logistic Regression

A logistic regression analysis was conducted to determine if the level of dissonance experienced was predictive of completing the letter writing strategy as one's preferred reduction mode. In logistic regression, as with regular multiple regression, multicollinearity can affect the trustworthiness of beta coefficients and it can lead to predictors being included in the model that add little explanatory power to the outcome (Field, 2009, p. 224). As such, the high correlation between self-directed negative affect and shame ($r = .83$) was a concern in the logistic regression analysis as a correlation of

.80 or greater can indicate multicollinearity (Menard, 2002, p.76). Fortunately, tolerance and VIF values indicated multicollinearity was not an issue.

The assumption of linearity between the continuous predictors and the logit of the outcome variable was assessed by examining the significance values of the interaction terms created from the predictors and their respective log transformations (Field, 2009, p.273). All the interactions terms had nonsignificant p values ($ps > .15$) indicating that this assumption was met.

Assumptions related to ANCOVA

To run an ANCOVA in terms of how the dissonance reduction strategies performed at reducing dissonance the three dissonance subscales were averaged to form an overall measure of dissonance. This was necessary in order to produce a corresponding covariate (overall dissonance at time 1). If the subscales remained separate this would have resulted in three separate ANCOVAs and correcting for Type I error inflation across these tests likely would have reduced statistical power. And as is this primarily an exploratory analysis, given that the reduction options were not randomly assigned to participants, a combined measure of dissonance was deemed suitable.

Participants did not choose equally among the reduction strategies. That is, many participants chose the external justification option ($n = 62$) and only a few chose the behaviour option ($n = 12$). As such, this makes for very unequal cell sizes in an ANCOVA. To correct for this unbalanced design, participants who chose the behaviour option were excluded from the analysis as a cell with only 12 participants could impair interpretation of the results. While examining if the behaviour strategy would reduce dissonance more than a cognitive strategy is a question worth pursuing, this study was

not designed to address this outcome. Future studies that randomly assign reduction strategies to participants following a dissonance-inducing task will be better positioned to address this question. To further compensate for the unbalanced design (cell sizes among external justification, denial of responsibility, and distraction had *ns* equal to 62, 39, and 30, respectively) cases were randomly deleted from the external justification variable. This resulted in a cell size of 39 instead of 62. With random deletion of cases the results from the ANCOVA did not change substantially. With the smaller cell size the covariate achieved the same significance level as with the full sample (i.e., significant at $p < .001$) and the main effect of choice was still significant, at $p = .016$ instead of $p = .011$ as with the full sample size. As such, the full sample size was maintained.

To check if the covariate (dissonance at time 1) was independent of the strategy chosen variable, an ANOVA was conducted with dissonance at time 1 as the outcome and strategy chosen as the predictor. This would assess whether the covariate was equal across the levels of the predictor (i.e., external justification, denial of responsibility, and distraction). A nonsignificant result for the main effect of chosen strategy, $F(2, 128) = .29, p = .75$, indicated these variables were independent and that an ANCOVA could be conducted. However, a significant interaction between the covariate and the chosen strategy variable ($p = .009$) indicated that the assumption of homogeneity of regression slopes was violated. To correct for this violation, the positively skewed distributions of the dissonance measures at times 1 and 2 were changed with log transformations. The data for these variables approached normality and when the analysis was conducted with the newly transformed variables the assumption of the homogeneity of regression slopes was no longer violated ($p = .065$).

Appendix E:
Study 2: Correlations, Descriptives, Data Screening

Table 16
Study 2: Correlations, Means, and Standard Deviations among Variables

	11	12	13	14	15	16	17	18	19	20	M	SD
.11		.02	.05	.00	.05	-.01	-.20	.14	-.14	.23*	4.55	1.45
-.08	.06		.10	.04	.24*	-.06	.16	.03	.03	.35**	.33	1.28
.10	-.02	-.02	.07	-.13	.06	.04	.04	-.02	-.08	.06	2.42	1.38
.02	-.07	-.07	-.15	-.16	.08	.10	.07	-.01	-.09	.00	2.13	1.28
.04	-.03	-.03	.07	-.09	.18	-.02	.07	-.07	.09	.02	2.73	1.46
.04	-.03	-.03	.05	-.09	-.07	.14	-.02	.15	.01	.11	4.33	1.49
.24*	.31**	.31**	.42**	.65**	-.16	-.06	-.08	.30**	.00	.00	3.24	.46
.26**	-.08	-.08	-.03	-.05	-.07	.23*	.07	-.01	.12	-.24*	12.46	3.60
-.07	.16	.16	.28**	.07	-.10	.15	.07	.04	.06	.19	3.58	.54
.35**	.16	.16	-.08	.19	.06	.06	.03	.16	-.03	-.28**	4.62	1.47
-	.41**	.41**	.24*	.20	-.18	.24*	.08	.08	-.03	.00	5.37	1.24
	-	-	.45**	.29**	-.14	.04	.03	.09	.00	.13	4.99	1.13
			-	.19	.02	-.10	.10	-.02	.02	.09	5.27	1.41
			-	-	-.07	.03	.01	.34**	-.10	.03	4.89	1.32
					-	-.10	.24*	.03	.10	-.01	2.20	1.62
						-	.36**	-.09	.02	-.08	4.20	1.89
							-	-.09	.10	-.11	3.34	1.70
								-	-.24*	.16	4.83	1.84
									-	-.25*	3.41	1.82
										-	20.86	6.93

Measure	1	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Impt	-	.06	.07	.07	.08	-.04	.03	-.17	.01	-.06
2. Egg		-	-.02	.04	.16	.05	.03	-.14	.05	-.02
3. Shame			-	.84**	.73**	-.45**	-.25*	.14	.08	-.06
4. Neg				-	.72**	-.44**	-.35**	.12	.02	-.06
5. Dis					-	-.60**	-.15	.07	.02	.01
6. Pos						-	-.15	.07	.02	.03
7. SE							-	-.03	.16	.21*
8. SM								-	-.03	.32**
9. CC									-	-.31**
10. Extra										-
11. Open										
12. Agree										
13. Con										
14. Emot										
15. Free										
16. Expense										
17. Resp										
18. Letter										
19. Distr										
20. Age										

Note. Impt = Importance; Egg = Proportion of consumed eggs that were cage free; Shame = Shame overall; Neg = Negative Self overall; Dis = Discomfort overall; Pos = Positive affect overall; SE = Self-esteem; SM = Self-Monitoring; CC = Cognitive consistency; Extra = Extraversion; Open = Openness; Agree = Agreeableness; Con = Conscientiousness; Emot = Emotional stability; Free = Perceived freedom; Expense = Rating of expense option; Resp = Rating of responsibility option; Letter = Rating of letter option; Distr = Rating of distraction option. * $p < .05$; ** $p < .01$.

Data Screening

Data entry errors were identified by checking for out of range values for all variables. Problematic values were corrected by identifying the relevant case, checking the data against the original paper questionnaire, and replacing the errors with the correct values.

Missing Data Analysis

An initial check for missing data was conducted by examining the frequency tables for each variable. Every variable, when examining the data as ungrouped and grouped, has less than 5% missing data. When examining the pattern of the missing data all test values for Little's MCAR indicated the data were missing completely at random ($ps > .10$).

Outliers

Exploration for univariate outliers was conducted by identifying z-scores for values that exceeded ± 3.29 (Tabachnick & Fidell, 2007, p. 73). No values were in excess of 3.29 for any of the grouped data and as such transformations or score alterations were unnecessary for outlier correction.

Screening for multivariate outliers was conducted with Mahalanobis Distance statistics. Statistics for all four cells indicated that no significant multivariate outliers were present in the data. All cases had a Mahalanobis distance less than $\chi^2(23) = 49.73$ (the range of Mahalanobis distances across all four cells were 16.23 – 24.04).

Normality of Data

An overview of the normality of the data was conducted by creating histograms with normal curves and conducting a visual graphical inspection of the data. Skewness

and kurtosis were assessed numerically by producing values for each of these measures on all continuous independent and dependent variables. The variables were examined by grouping the data according to hypocrisy condition and attitude importance. Only the data in the standard hypocrisy condition, for both low and high importance cases, displayed non-normality with skewness and kurtosis scores significant at $p < .05$. Eight variables had skewness values indicative of non-normality, and three of these variables also had problematic kurtosis scores. All variables, except the positive affect subscale of the dissonance thermometer and the preference rating for direct confrontation as a dissonance-reduction strategy, demonstrated a moderate level of positive skewness. Skewness values ranged from 1.98 to 4.29, with significant skewness indicated by values above 1.96. In order to maintain interpretability among the variables, especially when comparing the values of the different dissonance subscales at both times 1 and 2, the variables were left untransformed. This was considered an acceptable solution as Tabachnick and Fidell (2007, p. 87) have noted that when variables are all moderately skewed in the same fashion transformations offer marginal improvements in terms of analysis.

Homogeneity of Variance-Covariance Matrices

The assumption of equal variance-covariance matrices among the cells of the MANOVA was assessed with a Box's M test. A nonsignificant result on this test with α set at .001, Box's M = 179.50, $p = .004$, indicated this assumption had been met (Tabachnick & Fidell, 2007, p. 252).

Potential Covariate for MANOVA

As for Study 1, a MANCOVA was considered for the main analysis in Study 2 given that self-esteem was significantly correlated with many of the dissonance thermometer subscales (see correlation table). Beyond this empirical basis, self-esteem was considered as a potential covariate because social psychologists have commented on its possible role in the experience of dissonance (Aronson, 1999; Steele & Liu, 1981; Stone & Cooper, 2001). Results from the MANCOVA indicated self-esteem was significantly correlated with the composite dissonance dependent variable, as indicated by a significant effect of self-esteem on dissonance, Wilk's Lambda = .85, $F(3, 91) = 5.18$, $p = .002$. However, to ensure that self-esteem was an appropriate covariate for the analysis, interactions among it and the other independent variables were examined to ensure homogeneity of regression. A significant interaction between time, attitude importance, condition and self-esteem ($p = .05$) as well as significant interactions between time and self-esteem ($p = .046$), and attitude importance and self-esteem ($p = .02$) indicated that this assumption was violated and that a MANCOVA with self-esteem as the covariate was an inappropriate analytic strategy. As such, the main analysis proceeded as a mixed model MANOVA and discussion regarding self-esteem will be limited to bivariate correlations.

Multicollinearity

Bivariate correlations were calculated for all variables to assess multicollinearity. The repeated measures variables from the dissonance thermometer had correlations above .70 but this was expected and is not problematic (Tabachnick & Fidell, 2007, p. 89). However, correlations among the subscales of the dissonance thermometer were high in some cases (e.g., .88 between *shame* at time 2 and *self-directed negative affect* at time 2).

Although Tabachnick and Fidell (2007) warn that highly positively correlated dependent variables in a MANOVA could reduce power, others have suggested that the opposite may be true (Field, 2009, p. 586) and as such all three dissonance subscale variables were included in the MANOVA to form the composite dependent variable.

Multicollinearity specific to logistic regression. The high correlation between *self-directed negative affect* and *shame* at time 1 ($r = .84$) was a concern in the logistic regression analysis as a correlation of .80 or greater can indicate multicollinearity (Menard, 2002, p.76). To explore this possibility further, tolerance and VIF values were examined (.30 and 3.30 respectively), which indicated multicollinearity was not an issue.

The assumption of linearity between the continuous predictors and the logit of the outcome variable was assessed by examining the significance values of the interaction terms created from the predictors and their respective log transformations (Field, 2009, p.273). All the interactions terms had nonsignificant p values ($ps > .10$) indicating that this assumption was met.

Assumptions Related to ANCOVA

As in Study 1, a covariate was created by averaging Time 1 measures on the three negative dissonance subscales (i.e., shame, uneasiness, negative self-affect) to produce an overall measure of pre-reduction dissonance. An ANCOVA model was used to examine differences in self-reported dissonance at Time 2 as a function of chosen dissonance-reduction strategy, with Time 1 dissonance scores as a covariate.

Participants did not choose equally among the dissonance-reduction strategies. Many participants chose to write in support of cage-free chicken practices ($n = 41$) and many also chose the external justification writing option ($n = 29$). Nineteen participants

wrote about completing psychology studies and only 9 participants chose the responsibility option about the role that farmers play in battery-caged egg production. As such, this made for very unequal cell sizes in the ANCOVA. Unequal cell sizes could result in serious violations of assumptions underlying ANCOVA. To investigate this possibility and its potential impact on the analyses, a number of steps were taken.

First, to correct for the unbalanced design, participants who chose the responsibility option were excluded from the analysis as a cell with only 9 participants could impair interpretation of the results. To further compensate for the unbalanced design, cases were randomly deleted from the external justification variable and the support variable. The final cell sizes were 25 for external justification, 25 for support, and 19 for the distraction item. With random deletion of cases the results from the ANCOVA did not change substantially. In fact, with the smaller, more balanced, cell sizes, the covariate achieved the same significance level as with the full sample (i.e., significant at $p < .001$) and the main effect of strategy choice was still statistically significant (e.g., $p = .007$ instead of $p = .005$). Given that manipulations to the data to achieve balanced cells did nothing to change the overall results, the full sample was maintained for analysis and reporting purposes.

To check if the covariate (dissonance at time 1) was independent of the strategy chosen variable, an ANOVA was conducted with dissonance at time 1 as the outcome and strategy chosen as the predictor. This would assess whether the covariate was equal across the levels of the predictor (i.e., external justification, denial of responsibility, and distraction). A nonsignificant result for the main effect of chosen strategy, $F(2, 86) = 1.08, p = .35$, indicated these variables were independent and that an ANCOVA could be

conducted. Lastly, a nonsignificant interaction between the covariate and the chosen strategy variable ($p = .96$) indicated that the assumption of homogeneity of regression slopes was met.